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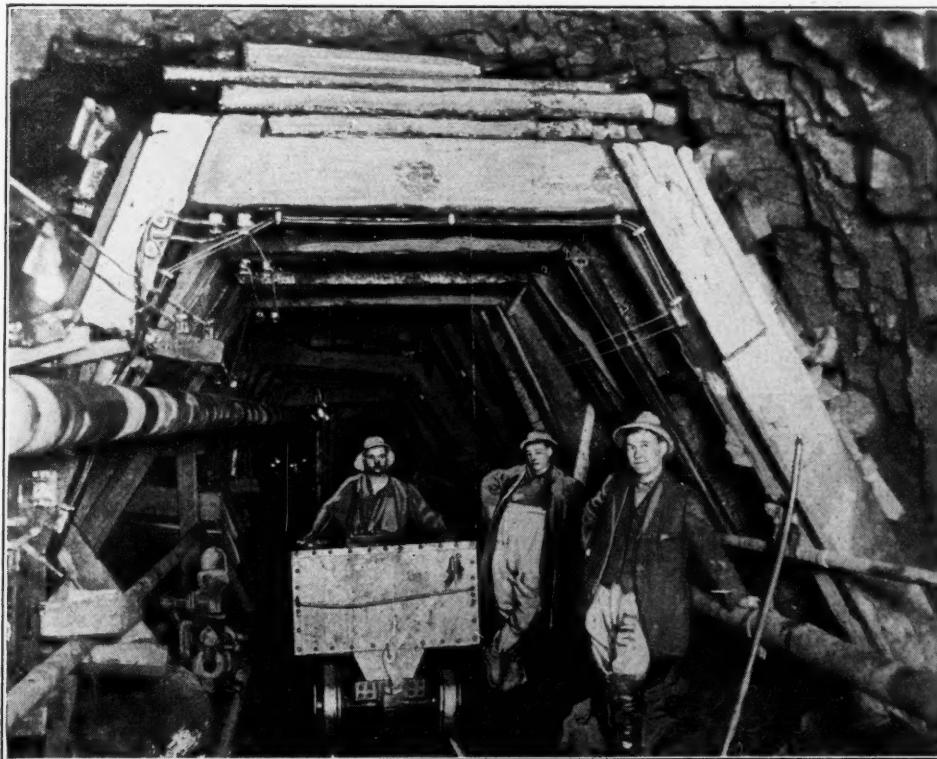
No. 3

## CONSTRUCTION FEATURES ON THE PASSAIC VALLEY SEWER

**Contractors' Methods and Plant Employed in Tunnelling for Sewer Two Hundred and Fifty Feet Beneath Newark Bay and Bayonne—Timbering Shafts and Tunnels—Handling Excavated Rock.**

The Passaic Valley sewer, which will carry to New York Bay the sewage formerly turned into the Passaic river by some dozen or more municipalities in northern New Jersey, is now about one-third completed. Actual construction work has been going on for about two and a half years and it is estimated that it will require at least three years more to finish the work, the total cost of which will be about \$12,000,000. Practically all the contracts have now been let for the work and construction is going on rapidly.

the bay. On the salt meadows just outside Newark will be erected the pumping and treating plants. Here the sewage will be screened and passed through grit and sedimentation chambers to remove all the objectionable suspended material possible. Sufficient head will be maintained at the pumping plant to force the sewage into the bay. The final discharge will be through concrete pipes from the terminal chamber on the reef. By a fan-like arrangement of outlet pipes, a thorough distribution of the sewage will be assured.



Courtesy Newark Evening News.  
TIMBERING TO SUPPORT LOOSE ROCK, BAYONNE, 100 FEET BENEATH SURFACE.

From Paterson, where it is a pipe four feet in diameter, the sewer parallels the Passaic river to its mouth, receiving on its way the sewage from Glen Ridge, Bloomfield, Belleville, Nutley, Passaic, Paterson, Acquackanonk, Garfield, Wallington, Harrison, East Newark and Newark. At the latter place the tube, now twelve feet in diameter, makes a vertical drop about 268 feet (to a distance of 250 feet below sea level) to pass under Newark bay. At Bayonne it rises 168 feet and at this elevation (100 feet below ground level) passes under Bayonne and New York bay to Robbins Reef where it discharges through pipes into

Municipal Journal will publish a series of articles describing various parts as it progresses. The present article will deal with the work of the New York and New Jersey Construction Co. on the tunnel under Newark bay and between Bayonne and Newark. For former articles on the Passaic Valley sewer that have appeared in Municipal Journal, see the issues of April 3, 1913, May 11, 1910, and March 27, 1907.

The section on which the above company is employed begins at the foot of Doremus avenue, Newark, and extends to a point in Bayonne 2,000 feet from Newark bay.

It consists of the construction of 9,020 feet of 12-foot concrete-lined tunnel 250 feet below the bay, and of 2,000 feet of similar tunnel 100 feet under the surface at Bayonne. On the Newark end their work adjoins that of the Booth & Flinn Co. and on the Bayonne end that of the O'Rourke Engineering & Constructing Co., which will carry the tunnel out to the reef. All of this work is through solid rock. Under Newark bay, a rather porous rock has been encountered and this necessitates constant pumping. The Bayonne tunnel is practically dry.

In order to do away with the confusion and difficulty encountered in the use of minus elevations, mean sea level was assumed to have an elevation of 300 feet. This made the top of the shaft at the Bayonne tunnel 318.8, while the bottom of the lower tunnel at the same place was 50.4.

Alongside the shaft another about three feet in diameter has been sunk. At the bottom of this a pump will be installed and an entrance made to the main tunnel, so that workmen may be lowered down this to enter the big pipe, or, if the sewer is shut off, it may be drained all the way out to Robbin's Reef by means of the pump.

The sewer drops about 260 feet in elevation at Newark in order to pass under the bay without the use of air in the construction, and rises 168 feet at the Bayonne shaft. Both the descent and the rise are vertical. The tube under Newark bay has a slope of 1 foot in 9,020, while from this point to the outlet it has a grade of 1 in 17,000. Throughout the entire section, including the vertical pieces, the sewer has an internal diameter of 12 feet and is lined with 18 inches of concrete.

Before the work was started, borings were made in Newark bay to determine the character of the material through and under which the tunnel would be driven. Under the water, which varies in depth from five to twenty feet, there was approximately twenty feet of black mud. This was followed by (all the depths are approximate only, as they varied somewhat in different parts of the bay) ten feet of sand, ten feet of sand and clay, thirty feet of red clay, twenty feet of clay and boulders and below this sandstone, "Newark formation" and some trap.

On April 6, 1914, the drills were first started at the Bayonne shaft. During that month seventy feet of shaft were sunk. In May the shaft was sunk thirty feet more and the upper (outlet) tunnel started and driven 100 feet. The work in the heading was temporarily abandoned and that in the shaft recommenced on May 25. During June the shaft was sunk 125 feet. Since that section of the shaft between the upper and lower tunnels, between elevations 84 and 212, forms a part of the sewer proper where it rises vertically from one level to another, it had to be concreted. By the end of August, the work of sinking and concreting the shaft had been finished and the heading of the lower tunnel had been driven in about 150 feet and that of the upper one continued about 50 feet further.

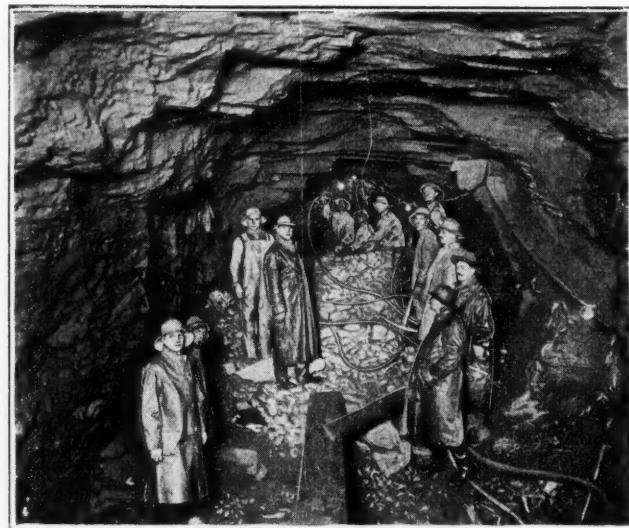
During this time a bucket was the only means of communication with the lower levels and all material had to be handled in this way. The work of timbering so that cages could be put in service was now begun. In order to save time and material in placing this timbering, a method designed by R. H. Keys, engineer in charge, was used. Casings made in the shape of a pentagon and built in twenty-foot sections were put together on the surface and lowered into place. These casings were made of four 8x8 timbers and one 6x8, set vertical and braced at intervals of five feet with a 6x8 and two 4x4's. This was guided into place from above and fastened by means of expanding bolts set into the concrete lining. (This style of timbering was used in that section already concreted.) Once the casing was fastened in place, the 4x4 timbers were

sawed out to make room for the cage. Guide supports are 6x8 and guides for the cage 4x8.

In the section above the upper tunnel, where the shaft was not concreted, the timbering is in shape of an elongated octagon made of 8x10 timbers. A frame is placed every five feet in vertical distance and landings are located every twenty feet. Guide timbers are 4x8 as in the lower shaft. The cage shafts, which are 5 feet 9 inches by 7 feet 10 inches, had to be set in this frame at right angles to each other in order to get them in the shaft. This caused some difficulty in the lower tunnel as will be explained later.

The head frame, which is 28 feet high, is made of 12x12 timbers. A landing platform and trestle is located around the head frame on another bent about twelve feet high in order to simplify the handling of stone and other materials that come up from the tunnels. One end of this trestle extends to a dump, the other to a stone bin. In order to allow room to set the hoisting engines, the sheaves on which the cages are hung are set at an angle to each other. Two hoists are used: a Lambert electric and a Lidgerwood steam. On the upper tunnel cage, the speed was cut to half and the power saved correspondingly by attaching one end of the cable to the head frame. Counterweights may be placed on the other hoist to lighten the load.

It was necessary to timber only a small section of the tunnels, as the rock was of such a character that supports were not required except for a short distance under the bay.



Courtesy Newark Evening News.

#### TUNNEL HEADING 265 FEET UNDER NEWARK BAY.

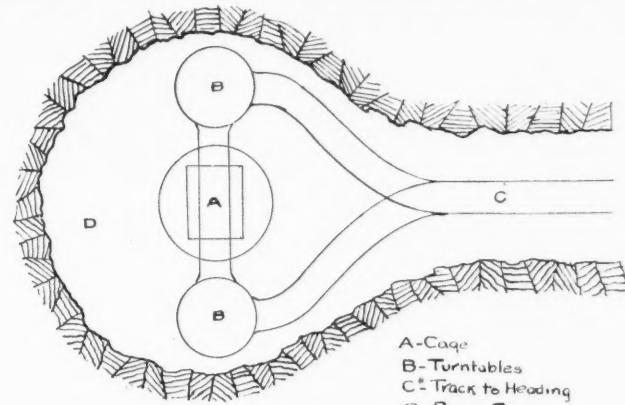
The work of tunneling is going on at the rate of about 60 to 75 feet per week in each of the three headings (one from the Newark shaft and two from the Bayonne). For drilling the holes, "star" drills are used. These have a  $\frac{1}{4}$ -inch hole through the core and water is sprayed through this hole to do away with the dust. Leyner drills are used and the method of drilling, blasting and removing the rock is the same in all three headings. Two lines of holes are first drilled in the heading about six feet apart and eight or ten feet deep. These holes converge toward a common center. This is called the "cut" and takes out the first section of the rock, the dynamite bringing out a "V" shaped section of the rock. Around the edge of the cut another line of holes is drilled, also pointing slightly toward the center. After this is blown out, a final row, which gives the outline of the tunnel, is driven. About 50 pounds of dynamite is used for each series of holes and the firing is done from a switch near the shaft after the heading has progressed sufficiently far

so that the men can endure the concussion. For the first 600 feet or so, the charges are fired from the top of the shaft.

These blasts open out the tunnel for a distance of about eight feet down from the top. The remainder is called the bench and is a ledge about five feet high and extending some 25 feet back from the heading. Holes are drilled straight down into the bench and this is blasted out at the same time that the heading charge is fired. After the blast, the heading is a mass of loosened and shattered rock of all sizes.

Sanford-Day dump cars with a capacity of 36 cubic feet are used to handle all material. These are hauled by a General Electric storage battery locomotive, which brings them from the shaft to the heading as empties and takes them back again loaded. The tracks, which are of thirty-inch gauge, are placed on one side of the center of the tunnel, leaving room for workmen and the ditch to the sump on the other side. As soon as a blast is fired, these cars are run back toward the heading. Iron pipes are wedged into the sides of the tunnel about the height of the bench and three-inch planks are laid on these as runways. The runway planks are so placed that when the cars are pushed under them a wheelbarrow may be easily dumped from the planks to the cars underneath. Two pickmen and two shovelers in addition to the barrow man make up the usual barrow crew and three or four crews are usually employed in a heading. The stone too large to handle in this way are usually rolled off the bench into the cars or are broken up into convenient sizes. About four cars constitute a load for the electric locomotive.

Arriving at the shaft, the loaded cars are run onto a switch and a string of empties is taken back. The attendant and his assistant then load the cars onto the cage and send them up one by one to be dumped. At the upper shaft, this is easy as the tracks lead from the switch directly onto the cage car; but at the lower level, where the cage is at right angles to the tunnel, different methods had to be employed. Here a large chamber some thirty feet in diameter was blasted out at the foot of the shaft. In this a turntable was placed opposite each end of the cage, so that an empty car could be run off, turned and sent back into the tunnel over one branch of a Y, while the loaded car was run over the other branch onto the turntable at the other end and onto the cage.

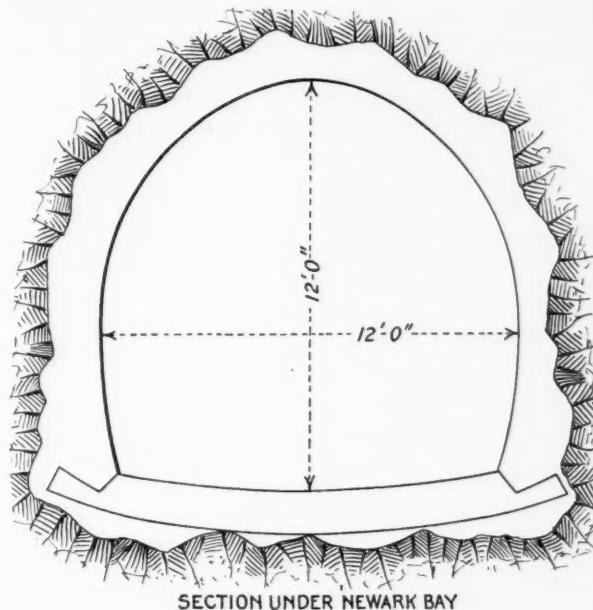


SKETCH OF FOOT OF SHAFT, LOWER TUNNEL

The turntables used here are of very simple design, consisting merely of a flat circular plate of cast iron about 6 feet in diameter, roughened on top and revolving on bearings. Cars when run onto this plate may be turned in any direction. The rails leading from the table are curved apart at the ends, making it easy to guide the cars onto the track.

The cars are loaded onto the cages as described and

sent to the top. Arriving there, they are run onto another turntable of similar construction and run towards one end of the trestle. If the rock is worthless for building or concreting purposes, it is dumped at one end of the trestle into another car which in turn dumps it onto a waste pile. On the other hand, if the rock is of good



STANDARD SECTION OF SEWER UNDER NEWARK BAY.

quality, the car is taken to the other end of the trestle and the rock dumped into a bin.

The rock dumped into the bin is fed into an Acme stone crusher and carried by a moving bucket conveyor to a cylindrical revolving screen, which separates the stone into three sizes:  $\frac{1}{2}$ -inch and under,  $\frac{1}{2}$  to 2-inch and over 2 inches. The two former are collected in bins and dumped in storage piles. The largest stone passes through the screen and falls down a chute into a small Farrel crusher, from which, when recrushed, it again falls into the bucket conveyor and is again carried to the screen.

Two men are employed most of the time caring for the stone in the bins, which they transport to storage piles by means of a small dump car. It has not yet been decided whether the screenings will be used for concreting or not.

The tunnels, which are both of the same size, are furnishing about  $6\frac{1}{2}$  yards of stone per running foot. From the upper section of the shaft 11 cubic yards per foot were taken out, a total of 932.8 yards. From the section between the two tunnels, 8.4 yards per foot were taken out, a total of 1,033 yards. Although the character of the rock throughout the whole length of the tunnel is not known, it is thought that nearly enough suitable for concrete will be secured to line the tunnels. It is estimated that about 12,000 cubic yards of concrete will be required for the work of lining the tunnel on this section.

As before stated, the work of concreting the shaft between elevations 85.4 and 212 was done in July and after the headings had been driven in some distance. Up to this time a  $\frac{3}{4}$ -yard bucket had been used to handle all material and the same method had to be employed in placing the concrete in the shaft.

A Ransome concrete mixer No. 40 driven by a 30 h.p. electric motor furnished the concrete for lining the shaft. This was mixed 1:2 $\frac{1}{2}$ :5. The mixer was placed near the top of the shaft and discharged directly into the  $\frac{3}{4}$ -yard bucket and this in turn was lowered directly into the

shaft and dumped inside the forms. The concrete was then tamped in place. The lining was placed in 5-foot sections, 15 feet being placed every other day. Blaw steel collapsible forms were used.

Air and water are supplied to the headings through pipe lines. A 6-inch wrought iron line carries air under a pressure of 100 to 120 pounds to the workmen in the tunnels. This is used to drive the tools. It is supplied by a Laidlaw-Dunn-Gordon and a Sullivan compressor, having respectively a capacity of 700 and 1,200 feet of free air per minute. Both these compressors are electrically driven, but a steam-driven compressor of sufficient capacity is held in reserve in case of a breakdown.

Another 6-inch wrought iron line carries air for ventilating purposes. A pressure of 2 pounds per square inch at the top of the shaft gives an effective pressure of  $1\frac{1}{4}$  pounds at the lower tunnel. After a blast, enough air is discharged from this pipe to drive out the fumes of the explosive. This pipe replaced one made of galvanized sheet iron, which lost much air by leakage.

A 2-inch main supplies all the water needed for industrial purposes.

While the upper tunnel is comparatively dry, the lower one is wet and gives promise of yielding still more water. The sump at the Bayonne end is 28 feet wide, 30 feet long and 6 feet deep, in fact it takes up all the space under the room blasted at the foot of the shaft and extends some 25 or 30 feet from the shaft in an opposite direction to that of the tunnel. There are two pumps in service; a motor driven electric pump with a capacity of 250 gallons per minute against a head of 270 feet and an air-driven pump capable of handling 130 gallons under the same conditions. Both discharge through a 6-inch pipe. They may be worked separately or in combination, the discharges being regulated by valves.

In the deep tunnel, at a distance of about 800 feet from the shaft, a safety bulkhead was put in place. This bulkhead, which is designed to withstand a pressure of 110 pounds per square inch, (equivalent to a head of 250 feet) is of reinforced concrete five feet thick at the sides, tapering to three feet in the center. Three-inch, 30-pound rails are used for reinforcing. There is a door in the center of the bulkhead which is 4 feet 5 inches by 4 feet 6 inches and hinged at the side. It is built up of 8-inch timbers between seven 8-inch, 22-pound I-beams and is built to withstand the same pressure as the bulkhead itself.

The above description of the work covers that at the Bayonne end chiefly, but also applies to that at the Newark end. The main difference in the methods at the two ends lies in the fact that at Newark, steam power is used and at Bayonne electric power.

The men work in 8-hour shifts and the work goes on continuously. R. H. Keys is engineer in charge, Robert E. Parker is shaft superintendent and James Fitzgerald is in charge of the office work. At present the tunnel under the bay has been driven about 1,200 feet from each end and the tunnel under Bayonne has progressed about 1,000 feet.

#### INCREASING SEWER CAPACITY.

A number of cities have found it possible to postpone the expenditure of large sums for constructing larger water mains, which seemed necessary, by removing deposits from the mains; but it is seldom we learn of a similar advantage being secured by cleaning sewers. Manistee, Mich., according to a statement made by Carl E. Ruger at the City Managers' Convention, had found it apparently necessary to rebuild a section of 4-foot sewer twenty-seven years old, and was about to issue \$30,000 in

bonds for that purpose. Before doing so, it was decided to learn what effect the cleaning of the sewer would have, and 1,102 tons of sand and refuse were removed from the sewer at a cost of \$1,200. This resulted in so increasing the capacity of the sewer that it is now believed to be adequate for some time to come, and the reconstruction of the sewer has been postponed indefinitely.

#### SEWER CONSTRUCTION AT LUDINGTON

##### Difficult Construction In Water-Bearing Sand—Segment Block Sewer and Steel Sheetings—Concrete Sewer Built Under Water.

By GEORGE W. CLARK, City Engineer of Ludington, Mich.

The following article and accompanying photographs describe in a general way the construction of a trunk sewer of the combined type, now being constructed in the city of Ludington, Michigan, which drains an area of one square mile and discharges into Pere Marquette lake, which is connected by a channel to Lake Michigan.

The sewer is 6,400 feet long and varies from 72 inches to 42 inches in diameter, and replaces an old one which had become too small and was overloaded by every rain-storm of any intensity. For the new sewer it was decided to adopt the vitrified clay segment block construction, and those used by the contractor were furnished by the American Sewer Pipe Co. It was decided to build the new sewer a few feet to the west of the old one as at present practically all of the drainage comes from the east and in this way there need be no interruption of service, and this location would make the contractors a little more lenient in their figures. The contract was let to Albert Prange and Van der Weele Bros. of Grand Rapids, Mich.

The soil through which the sewer is laid is a water-bearing sand, with places perhaps two hundred feet long showing clay and marl, but no genuine quicksand has been found. To keep the water from circulating underneath the sheeting, Lackawanna steel sheet piling was used and driven at least two feet below the invert.

In the first 3,200 feet of the work water was found from six to eight feet above the invert and considerable water seeped through the interlocks of the sheet piling and through all openings. The method of taking care of this water was to place a sump hole about thirty feet ahead of the last tile laid and dig about six inches below grade so the water would run to the sump. After the first row of block was laid, the water would run through the under-



CENTER AND ARCH CONSTRUCTION.

drain in the block, and was also carried away from the block to the sheet piling and along the piling to the sump.

If the pumps balked or water came in so fast near openings that the pumps could not take care of it before the mortar had a chance to set and any joints were washed out, they were left for a day or two, when they either plugged themselves and were then pointed up, or about a quarter inch of cement jute was caulked in and the joint then pointed up.

The depth of ground water has increased from ten to sixteen feet, and in the last 600 feet the water does not rise more than eight inches above the invert and this water is easily taken care of by the underdrain in the first row of blocks.

We have found that with the fine sand and the amount of water we have, the only way to prepare the ditch for laying the segment blocks is to drain the water away from the blocks. When this is done, the bottom becomes hard and firm, but if the water is not drained out the sand acts a good deal like quicksand and causes much trouble. A sub-drain of regular drain tile does not work as satisfactorily as the above method.

Without the steel sheeting and the underdrain feature of the segment block I believe it would have been almost impossible to have secured as satisfactory a job of sewer work as we have.

The greatest difficulty in the work was caused by openings left in the sheet piling for conduits, gas and water mains. (All service pipes were cut off and hosed over before driving the sheet piling.) It was found to be almost impossible to stop up these openings entirely, and the water from the old sewer, the joints of which were

found to be in bad condition, would keep working in and carrying the sand with it and finally cause a cave-in, besides bothering the workmen in laying the sewer blocks. Rainstorms would always break through, flood the ditch and carry a large amount of sand into the new work.

Considerable difficulty has been experienced in driving and pulling the piles. Under favorable conditions the driver will put down forty to fifty feet on both sides of the trench per day. A 1½-inch pipe attached to the city pressure is used as a jet and it is probable that a larger jet with larger pressure would make the piles drive much more easily. It was found necessary in pulling the piles to use a jet to wash out the sand in the interlocks. For this purpose a ¾-inch pipe 16 feet long is attached to the city pressure and run down the length of the pile. Then, by using the sledge on the end of the pile and holding a strain on the pile with the excavator, they come out without much trouble, except when a small stone happens to be driven down in the interlock, when they sometimes pull two or three at a time.

For crossing under the ten pairs of rails of the Pere Marquette Co.'s right of way a concrete culvert-shaped section was used. As it was impossible to stop traffic on some of the tracks, they were supported by timbers on piles driven to clear the sheeting. It was, of course, impossible to use the steel sheeting except between tracks. After the trench had been excavated the water was pumped out, the forms placed and the water allowed to reach its level, and the concrete placed by displacing the water. This was very carefully done and the concrete work proved to be excellent. The top of the arch is not more than two feet below the base of rails and although



TRENCH SHOWING STEEL SHEETING, EXCAVATOR AND DIAPHRAGM PUMP.



EXCAVATOR PULLING STEEL SHEETING.

the ties were bedded and traffic resumed two weeks after placing the concrete, no sign of settlement or cracking has appeared in five months.

The contractors' plant consists of a Monighan excavator with a one-yard clam shell bucket, a Vulcan steam pile hammer, sixteen-foot Lackawanna steel sheeting, a Fairbanks-Morse four-inch diaphragm trench pump, a Standard Supply Co. three-inch trench pump and necessary small tools.

The pile driving crew consists of an engineer, fireman (who also tends the niggerhead for hoisting the piles), a man for hooking on the piles for placing, a man with the jet, and a man for guiding the piles in place. The driver crew also places the top row of braces for guiding the piles.

The excavator crew consists of an engineer, fireman and signal man when excavating or carrying piles to the driver; and when pulling piles, an extra man with the jet and one for sledging to start the piles.

The crew for laying the segment block consists of two block layers, two helpers, one man lowering blocks, one man carrying blocks, one man carrying mortar, one man mixing mortar, and two men throwing in dry sand as the blocks are laid. Besides these there are two or three handy men.

A small crew keeps ahead of the driver, taking up the macadam and excavating the soil (sand) to a depth of about four feet. This sand is carried away in dump wagons and leaves less to be piled on the streets to interfere with the machinery.

The average rate to date since June 15 has been twenty-five feet per day, and the average price paid per foot is \$10.35.

#### DEBTS OF LARGE CITIES.

According to the latest report of the Census Bureau, the combined indebtedness of New York, Chicago, Philadelphia and Boston equals that of all the other 199 cities of this country of 30,000 population or more; and that of New York alone is 40 per cent of the total indebtedness of the 199. Its per capita debt is by far the largest, Cincinnati and New Orleans being the only cities which approach it, and is four times the average of all cities of

50,000 to 30,000, 83 in number. The per capita debts of cities up to 300,000 inhabitants averages about \$38 to \$43, but averages \$73.65 for those of 300,000 to 500,000, and averages \$93.38 for the nine cities of more than 500,000.

#### REMOVAL OF DEAD ANIMALS IN CITIES

##### Ordinances and Practices in Nine Large Cities—Generally Done by Contract—Provisions as to Transportation and Disposal.

By ANDREW LINN BOSTWICK.\*

From a survey of the laws and practices of nine American cities with regard to the removal of dead animals from public places and private premises we are enabled to draw a few general conclusions of interest. The tendency appears to be for the municipality to contract for this work and to receive in some cases a fixed sum per annum from the contractor for the privilege of collecting and disposing of the animals. Sometimes the work is done by the same city department or outside contractor who disposes of all garbage. The regulations often provide that the owner of a dead animal may have it removed himself if he complies with certain conditions; and there is a stated period of time, from 3 to 12 hours, after which a dead animal must in any event be removed—if not by the owner, then by the contractor or department whose duty it is took after this matter. Most laws provide for odorless transportation of carcasses, and it is usually stipulated that the animals must be disposed of outside the city limits. The regulations of some cities apply only to the larger animals, such as horses; in other cases practically all animals, including domestic fowls, are subject to the laws. Below is presented a summary of regulations in force in 9 large cities:

*Chicago.* (1911 Code, secs. 1484-5).—The mayor and the health commissioner are given power to contract for the removal of dead animals, for a period of from one to five years. All bidders must specify the method to be used in disposing of the animals. The contract must provide for removal of carcasses in closed, covered vehicles, and must also stipulate that no animal may be skinned or rendered within 3 miles of the city. The contractor must execute a bond to the city in the sum of \$25,000.

Chicago now has its dead animals disposed of by contract, in accordance with the above. Going more into detail, the conditions which must be lived up to by the contractor are as follows:

All dead animals larger than a common rat (except domestic fowl) that may be found in the streets or public places shall be removed daily by the contractor to a place which the health commissioner has approved for final disposal.

Animals must be removed within twelve hours after orders are received from the Health Department, in any event.

The contractor must maintain proper depots for the reception of dead animals, approved by the health commissioner, and must keep these depots in a sanitary and clean condition.

Dogs and other small animals must be removed in wagons of a type approved by the health commissioner; the boxes of these wagons must be watertight, and covered with a close-fitting top or lid. Horses and other large animals must be removed in wagons also of special approved type, provided with a canvas covering, with

\*Municipal Reference Librarian, St. Louis Public Library.

which the animals must be completely covered during removal. Within one year after the date of the contract all dead animals must be removed in motor vehicles, corresponding in design to the above. The entire work must be conducted in such a way that no nuisance will result.

The contractor must deposit \$1,000 with the city comptroller.

The contractor has the sole right to remove dead animals from private and from public places. If the contractor fails to remove an animal within 12 hours the city may have the work done, and pay for it out of the contractor's deposit of \$1,000 above mentioned.

The contractor must make a daily report in writing to the health commissioner, showing just what work has been done.

*St. Louis* (1912 Code, Secs. 873-90, as amended by Ordinance 27693). The existence of dead animals in the city must be reported to the Health Department by police, health and street department employees, within 3 hours after discovery, and the Health Department must keep a record thereof. The city has a contract with a private concern for the final removal of dead animals, the Street Department collecting the carcasses and delivering them to the contractor at the latter's receiving depot. The present regulations also permit any person, firm or corporation to remove dead animals, by permit from the Street Department; such animals to be disposed of at least one mile beyond the city limits and conveyed thither without delay in covered wagons. In such cases a bond of \$5,000 must be filed with the city. These regulations make it difficult for anyone but the regular contractor to dispose of the dead animals.

If a carcass is not removed by the owner within five hours of daylight time after death (three hours from April 1 to November 1) it must be removed in the regular way by the Street department and the contractor.

Under authority of Ordinance 25101 (1912 Code, secs. 888-90) a 20-year contract for the disposal of dead animals was let to a private concern in 1910. The contractor removes all animals, including fowls, from public and private premises. The animals, as stated before, are collected by the Street Department (Garbage Division) and turned over to the contractor at an appropriately arranged depot. The city agrees to deliver all animals collected. The contractor agrees to dispose of the carcasses outside the city limits. All animals must be removed from the depot by 7 A. M. on the day following their receipt. The contractor pays to the city the sum of \$425 per month for the privilege of disposing of the animals, and deposits the sum of \$2,500 with the municipality.

During the fiscal year 1913-14, 24,623 dead animals were collected, of which about 50 per cent were dogs, 16 per cent horses and mules, 24 per cent fowls, and the remainder various other animals.

*Detroit* (1912 Code, pp. 404, 411). The owner of an animal that has died within the city limits must, within 12 hours, cause the carcass to be removed to such place as the Common Council provides, or one mile beyond the city limits. In Detroit dead animals are classed as garbage, and as such may be collected by the Department of Public Works. They must be transported in covered wagons.

*Buffalo* (1912 Code, p. 429). Persons or corporations desiring to remove dead animals must obtain a license therefor from the mayor, such license costing \$50 per year. All wagons used must be approved by the health commissioner. Removals must be made promptly upon notice from the Police Department or other source, and such removals must be without charge.

*Milwaukee* (Sanitary Code, 1912, pp. 96-8). If a dead animal is not removed from the city limits by its owner

within 12 hours after death, the commissioner of public works has the right to have the carcass removed. If the owner fails to have the animal disposed of within 12 hours he must notify the commissioner of public works or pay a penalty of \$10.

Every five years the commissioner of public works advertises for bids for the disposal of dead animals collected by the Health Department, and for the collection and disposal of all dead animals which may be reported to the Health Department. The bidder offering the largest bonus is awarded the contract, and must agree to collect all animals within 6 hours after receiving notice of the same.

*Cincinnati* (Health Board Manual, 1913, pp. 75, 76, 167, 173). The owner of any dead animal must, within 6 hours after the animal's death, notify the health officer, so that the carcass may be removed. All persons engaged in the removal of dead animals (except from the streets and public grounds by contract) must obtain a written permit from the Board of Health. Applications for permits must state the location of the place to which the animals are to be taken, and the exact disposition to be made of them. All persons doing such a business must report weekly in writing to the Board of Health.

Dead animals on the streets and public grounds are removed by the garbage contractor if the owners have not disposed of them in a lawful manner within 12 hours after the time of death.

*Washington* (Health Laws, 1911, pp. 91, 92, 231). Dead animals in streets are declared nuisances, and owners thereof must give notice to the Board of Health within eight hours after the animals die.

The District of Columbia, or its contractor, has the sole right to transport dead animals through the streets. The vehicles used must be covered, as nearly airtight as possible, and of a general design approved by the superintendent of street cleaning.

*Atlanta* (1910 Code, Secs. 1209-1219). The Board of Health is authorized to contract for the removal of dead animals such as horses and cattle. The contractor must give bond in the sum of \$500. All carcasses, whether removed by the contractor or by the owner, must be taken outside the city limits to such place as the health authorities may specify. Owners of dead animals must either remove them, in accordance with law, within 3 hours, or notify the health authorities so that the contractor may attend to the matter. The contractor must provide proper vehicles to do this work.

If the Board of Health so desires it may arrange with the contractor for the removal of small animals such as dogs, etc.

*Richmond, Va.* (1910 Code, pp. 376-7). The committee on street cleaning is authorized to let a contract for a term of two to ten years for the removal from public streets and places of dead horses, mules and cattle, and also for the removal of these animals from private premises at the written request of owners. It is unlawful for anyone except the contractor to perform such work. Owners of animals that have died must give immediate notice to the contractor. In each ward of the city the street cleaning committee designates a place where such notice shall be given. The contractor must remove the animals as soon as possible after notice, and in no case more than six hours thereafter. Police officers are required to notify the contractor of any dead animals.

Owners of dead animals on private property must advise whether or not they desire the contractor to remove them. If they wish to remove the carcasses at their own expense they may do so, within three hours after the animal's death.

## OPERATING SEWAGE DISPOSAL PLANTS

Suggestions of Committee of Indiana Engineering Society—Intelligence and Faithfulness in Operators—  
Operating Tanks, Contact and Sand Filters.

The Committee on Sewage of the Indiana Engineering Society, in its report to be presented January 22, devotes practically all of its attention to the subject of the proper operation and supervision of sewage disposal systems. This part of the report is given in full below. The committee consisted of Chas. Brossmann, J. C. Diggs, and H. W. Klausman.

"Sewage disposal projects in small towns and in institutional plants are, after their installation, usually neglected. They are not, as a rule, popular and the tendency is to see that they are operated properly at first and to forget them afterwards. Many in charge of such plants have the idea that they need no attention. They are allowed often to get in such shape that later a large sum may be required to place the plant in proper condition. In numerous instances such expenditures might have been avoided had proper attention been given. A plant, even though overloaded, if well looked after, will give fair results and even better results than a well-designed plant that is neglected."

"In some plants under observation it has been found that practically no attention whatever has been given the sewage disposal plant, consequently they have become inefficient and do not properly perform their function. In some instances, even with the inattention, the plant has continued to show good results, but in cases of this kind it will only be a matter of time when conditions will become serious and cause either useless expense or the plant will get in such condition as to be unable to purify the sewage."

"Persons in charge of sewage disposal plants should understand the principles of operating the plant and should be thoroughly familiar with the details of the plant. Operators should understand the dosing apparatus and know how to adjust same in case it gets out of order. They should be able to tell when the sedimentation or reduction tank is operating properly, whether too much suspended matter is being carried over to the filters or whether too much sludge is in the tank. Also when contact beds are being overworked or when sand filters are clogged or need to be raked. It does not take a technical man to know these things, but it requires a man who will look after these things and the plant at regular intervals and keep track of what it is doing. At municipal or public plants the city or county engineer could direct such work, and at public institutions the chief engineer at the plant is fully capable of getting results if he will devote the necessary time."

"Too little attention is usually given to the operation of sewage disposal plants and the plants are often left in charge of the poorest kind of labor. It is quite evident that instructions should be given to the operators of such plants if proper results are to be obtained and the aims of sewage disposal are to be accomplished."

"The following suggestions are given toward the proper operation of the smaller plants which can not receive expert supervision:

*"Septic and Imhoff Tanks.* As the purpose of such tanks is mainly for the separation and retention of the suspended matter to as great a degree as possible, the tanks should be kept in such condition that this will be accomplished, otherwise the efficiency of such tank will be impaired,

"To get the best results, large accumulations of septic sludge should be avoided when they cause violent abullition and a consequent carrying over of the sludge to the filters. The sludge should be removed when necessary."

"In using Imhoff tanks the sludge should not be allowed to get above the depositing slots at the bottom of the settling chamber.

"Large and unusual flows through the tank, such as storm water flows, should be diverted, especially in plain septic or sedimentation tanks. The removal of suspended matter should be as complete as possible, as the less of this matter reaches the filter beds the less trouble there will be in operation. Sludge should be blown off when possible at regular intervals, or at time of high water, unless provision is made for sludge drying."

"In the event that there is no stream large enough to carry off the sludge at high water, then a sludge bed, well underdrained, should be constructed and the sludge run on to this bed, allowed to drain and then removed. Settling chambers of Imhoff tanks should be kept free of sludge, and in some cases where the slope of hopper bottom is not steep enough the sludge should be pushed down through the slots or otherwise removed."

"In some Imhoff tanks sludge mats are liable to form on top surface of settling chambers and it will usually be found better to clean this mat off at intervals."

"The effluent from tanks of any kind should be examined at regular intervals. If solids are carried over it is likely to cause trouble in the siphons, and in the case of contact beds the sludge, if carried over in quantities, will clog the bed in time."

*"Contact Filters.* The main trouble with contact beds is the tendency toward clogging. Contact beds should not be overworked and should have stated periods of rest. It is impossible not to get some matter carried over from the tank, but this can be taken care of in a way to cause the least trouble, and to catch most of the material before it works into the beds. Proper and complete underdrainage will assist greatly in getting rid of accumulations, but it is safe to say that few contact beds are very thoroughly underdrained. Too little regard is usually given to good underdrainage and proper bottom construction to contact filters."

"In operating contact filters they should be filled by dosing; the sewage should then stand for several hours, usually about two hours. At the end of the contact period they should be automatically discharged and should have a suitable resting period of at least six to eight hours. Should the beds become in a clogged condition, the stone must be removed and cleaned or new stone placed."

*"Sand Filters.* The sand filter is not so liable to trouble as the contact bed, but it goes without saying it should be kept as free as possible from material that will clog. When ponding occurs the bed should be raked about  $\frac{3}{4}$  in. deep. The bed can be allowed to dry and the top skin will peel easily and can then be raked off. Slopes around filters should be sodded so that clay or dirt will not get into the sand and clog same."

"Where the sewage is discharged by distributors onto the bed it will be found advantageous to place large gravel or broken stone at such points, so that the sand will not be washed out or scoured."

"Low spots on the sand area should be kept filled so that the sewage will flow level and all parts worked as uniformly as possible. In freezing weather the surface of the filter should be furrowed."

"In conclusion operators who are not getting proper results out of their plants, or if they notice unusual conditions, should notify the State Board of Health, with a view toward getting things in proper shape."

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## CHANGE OF ADDRESS

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Contributions suitable for this paper either in the form of special articles or of letters discussing municipal matters, are invited and paid for.

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JANUARY 21, 1915.

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## Water Carriage of Wastes.

Practically all of our modern methods and appliances for dealing with excreta in cities are based on the transportation of such matter by water through pipes and conduits. The mixture contains about a thousand parts of water to one part of polluting matter. This system—water removal of sewage—was evolved when there was practically no thought of danger in river pollution, bacteria were unknown, and general purification of sewage almost unthought of.

Now millions of dollars are spent every year in removing from those thousand parts of water the one part of objectionable matter. Other millions are spent in building small sewers to carry this polluted water separate from the surface run-off. A large part of this could be saved if the offensive matters could be removed and treated in concentrated form. It is true that the problem has been studied and experimented on for years, and water-carriage has invariably been accepted as the solution. But our knowledge of the subject is increasing every year, and the importance is becoming manyfold greater. Thousands are trying to improve the methods of purifying this highly diluted mixture. Can not the Gordian knot be cut by preventing the dilution?

On the other hand, garbage is now handled in pails and wagons (in some cities after being drained of its liquor). This removal as now conducted is expensive and offensive. Putrid garbage is nearly, if not quite, as offensive as stale sewage matter; although it does not generally contain dangerous bacteria. Can not this be removed instead by water carriage or some other method? Perhaps in the existing sewers and treated with the sewage?

Of course, difficulties will at once suggest themselves, but what are they except spurs to the invention? For instance, large and heavy objects in the garbage would lodge in the sewers, but a simple contrivance in the house connection would catch the heavy matters and very large ones (generally metallic articles or bones), which could then be removed with the ashes.

The above are not, of course, recommendations but merely suggestions for study and investigation.

## Competitive Bids for Engineering Services.

Last February the Council of the Institution of Civil Engineers (the British national engineering society) sent the following notice to its members:

The Council have had their attention drawn for some time past to a practice which exists among local authorities, of inviting, by advertisement, engineers to submit in competition with others their terms for preparing plans and proposals for certain engineering schemes, accompanied then or perhaps at a later stage by estimates of the cost of the works proposed.

In the opinion of the Council such a proceeding is very undesirable in the best interests of the public authorities themselves and is derogatory to the engineering profession. The Council desire to express emphatically the repugnance with which they regard the practice in question. They have every confidence that the members of the Institution will support them by declining to respond in any way to such advertisements as those alluded to.

About two months ago a sewer board advertised, inviting the submission of terms for certain professional engineering services, to which a number of corporate members of the Institution responded. Learning of this, the Council on Dec. 7 addressed another circular to the members, stating that this was an act of professional misconduct and rendered the offender liable to expulsion from the society.

This is perhaps a stronger stand than has been taken by any technical society in the United States, but the principle is recognized here as the correct one. Bidding for engineering services in effect entirely disregards professional ability and standing and places a premium on that class of service which is as slack and superficial as will pass the muster of officials frequently incompetent to judge of it.

The very fact that municipal officials generally have not the technical knowledge which would enable them to pass upon the engineering services which may be given by those they employ, would seem to be a strong argument in favor of placing professional standing above remuneration asked in making their selection of an engineer. They can at least be fairly sure that none of those who submit bids for their services have a very high professional standing.

This does not, of course, mean that no city should employ any engineer unless he stand at the head of his profession, or that it should not consider the fee which he will charge. In a general way the size or difficulty of the work should control the selection of the engineer to design it; and if unsuspected difficulties are discovered by an engineer of limited experience who has been employed, he will, if worthy of confidence, urge that a more experienced consultant be employed to assist him.

An engineer is justified by professional ethics in giving as wide publicity to his experience and ability as may be

obtained by the recognized mediums of articles in technical periodicals, papers and addresses before societies, etc.; and in publishing his address where it can be found by those who wish to get into touch with him. But when he submits a bid for his services he puts these services on a par with those of the cheapest bidder—and some of them are awful cheap.

#### Organization of Street Cleaning Officials.

The following circular letter is being mailed to street cleaning officials throughout the United States and Canada by J. T. Fetherston, street cleaning commissioner of New York. He aims to send this to all such officials of whom he can learn; if any who see this notice should not receive a copy of his letter, it is hoped he will communicate with Mr. Fetherston.

DEAR SIR: During the recent exhibition of apparatus, held under the auspices of the New York Department of Street Cleaning, an informal conference considered the question of forming an association of street cleaning officials of the United States and Canada. The conference appointed the following committee to look into the advisability of forming an association and to take such steps as the facts elicited by them should warrant: J. T. Fetherston, chairman, New York; Richard T. Fox, Chicago; Gus Hanna, Cleveland, O.; Walter G. Leininger, Chicago, and G. B. Wilson, Toronto.

To assist the provisional committee in determining the policy to pursue, will you kindly state your views on the project?

A. Do you think the time has come when street cleaning officials should have an organization devoted exclusively to their interests?

B. Do you believe the coming together in conventions and the consequent interchange of views and experiences of street cleaning officials would be of sufficient benefit to justify the formation and continuance of an organization?

C. If you favor the holding of conventions, do you also favor exhibitions of street cleaning apparatus at the same time?

D. Do you favor annual or less frequent conventions?

E. Will you enroll as a member of an association of street cleaning officials, if one is formed?

Suggestions not included in the foregoing questions will be gladly received.

Please let me hear from you *within as short a time as possible*.

I will be greatly obliged if you will send to me—at once—the names and addresses of any street cleaning officials you may have or may be able to obtain. A complete list is not, to my knowledge, available anywhere.

Yours truly,

J. T. FETHERSTON,  
Supt. Department of Street Cleaning.  
Municipal Building, New York, N. Y.

#### PREVENTING AND REMOVING DIRT IN SEWERS.

A modern sewer properly designed and constructed should not collect any deposits, except those caused by an occasional unpreventable misuse such as the introduction of sticks, clothing and other articles for which the sewer was not intended. Unless a thorough final inspection of a new sewer is made before acceptance from the contractor, however, there will frequently be found accumulations in it of dirt, pick handles, bricks and all sorts of materials which have found their way into the sewer during construction by accident or carelessness. Clark A. Bryan, resident engineer of the Carlisle, Pa., Sewerage Commission, believes that a considerable percentage of these matters enter through the openings left in the sewer for manholes either before or during the construction of the manhole, and that this can be avoided in the case of a pipe sewer by laying the sewer continuously through the manhole, and leaving it in this condition until the bottom and sides of the manhole have been built and the cast iron top put in position. Then, when it is desired to inspect the sewer, or at some other time before it is put into service, the top half of the pipes

which are exposed in the manhole bottom can be cut off with a cold chisel. This plan not only protects the sewer from the entrance of dirt, but is more apt to result in a continuous channel of uniform cross section, line and grade through the manhole.

For removing from sewers dirt or other material, when this has not entirely choked the sewer, Mr. Bryan has employed the method of dragging through the sewer a scraper formed of a stiff iron plate or diaphragm fastened to the end of a wrought iron pipe. This was dragged through by a three-quarter inch rope, which was passed through a sheave braced in the bottom of the manhole at the end of the section of the sewer being cleaned and thence through the manhole to the surface, where it was wound upon a reel operated by hand. Occasionally where more power was required, an automobile was used for pulling the scraper, another sheave being fastened in the top of the manhole to prevent the rope rubbing against the edges of the manhole head.

In order to pass the ropes through the sewer, a parachute-shaped bag of oilcloth was made and fastened to the end of a quarter-inch rope. Water was turned into the sewer from a fire hydrant, and this carried the parachute through the sewer, dragging the rope after it. This quarter-inch rope was used to pull through the sewer the three-quarter inch rope which dragged the scraper.

#### DISPOSAL OF CANNERY WASTES\*

##### Experiments in Treating Corn and Pea Wastes by Screening, Sedimentation, Irrigation, Sand Filtration and Contact Filters.

With the growth of the canning industry in Illinois and with more stringent legislation regarding stream pollution, the problem of disposal of cannery wastes has become serious. Most of the wastes of the canning process are liquid, containing a large percentage of organic matter in solution or in very fine suspension. The simplest method of disposal is, of course, dilution, but this is not always possible.

The wastes from the factory at Washington, Ill., were discharged into a small creek. During low water season, many complaints were registered against the pollution of the creek and investigations were made to find some other method of disposal.

The wastes from the factory during the pea pack originate from several sources. Peas are cut in the field, loaded on racks like hay and hauled to machines which shell out the peas by a sort of threshing process. From these machines, where the vines are considerably bruised, they are carried to a silo, being washed on the way. Meantime, the shelled peas are being washed in a rotary wire cylinder. The wash water from the peas and vines and the seepage from the silo constitute the waste.

The corn pack wastes are much the same as those from the pea pack. The corn is snapped in the field, hauled to the factory and put through the corn husker, one of the essential parts of which is a series of rubber rolls which tear the shucks from the ears. In order to keep these rolls cool, it is necessary to maintain a constant spray of water upon them during operation. In the process building, the corn is cut from the cobs, which, with the husks, are discharged into the silo. The conditions are much the same as in the pea pack and the water extracts a high organic content from the corn.

There is in all about 60,000 gallons per day of water, highly impregnated with organic content and with vines,

\*Abstract of thesis prepared by Duane Englis under direction of Prof. Edward Bartow and Paul Hansen.

husks, peas and corn floating about in it, which finds its ways into the general waste of the plant.

Paul Hansen, engineer of the Illinois State Water Survey, designed a plant for the treatment of this waste. Roughly, the plans called for a screening chamber, sedimentation basin and broad irrigation. To save expense, the first two were made of  $2\frac{1}{2}$ -inch timber and, with the last, were hastily constructed just across the creek. The wastes were conveyed to them by a flume which discharged into the screening chamber. Solid wastes from the screening chamber were buried in shallow ditches near the plant. Four broad irrigation beds of about  $\frac{1}{4}$  acre each were used for the final disposal. These were roughly leveled and given a thorough cultivation. Earthen embankments were constructed around them.

During the pea pack, which lasted about two weeks, a 20-inch layer of pea vines was collected in the screening box, which was almost full of hard peas. About 40 cubic feet of sludge consisting mainly of hard peas embedded in a thick green slime were taken from the settling basin. It was estimated that the complete screenings and settling for the two weeks was approximately 65 cubic feet.

Only the southern irrigation bed was used during the pea pack as it was the only one low enough to fill by gravity. The bed was low at the southern end and was not crowned to any extent. It had been well plowed and harrowed and appeared capable of absorbing water rapidly. For the first few days, the water did not remain on the surface of the ground to any extent. About the fourth day there was a slight ponding in the lower portion, over approximately one-fifth the total area of the bed. This ponding increased from day to day. Until the afternoon of the sixth day no rain had fallen, so the weather conditions were most favorable to the success of irrigation. At this time a moderate precipitation occurred and cloudiness, with frequent heavy rains, continued through the four days following. The resulting additional quantity of water on the bed appreciably lessened its capacity for the waste. On the ninth day about three-fourths of the area was covered. The amount increased until the twelfth day, at which time the waste water stood 8 or 10 inches deep on the southern half and only a few high places in the northern portion were not submerged. Although this was the greatest quantity of the water which was present on the bed at any time, the rate of absorption by the bed was such that after a day and a half of disuse only a small puddle at the southern end remained. After the fourteenth day following the beginning of the pea pack, the effluent from the silo constituted the entire waste. On the seventeenth day the silo wastes were diverted from the irrigation beds. By the nineteenth day, or two days after the discharge onto the beds ceased, the ground used for irrigation had become quite dry. At the point of discharge there was a slight crust of vines and leaves. The soil did not appear to have become sticky, but still seemed to retain its natural character. Furthermore, no disagreeable odor was perceptible from the bed at this time.

While the waste was standing on the bed a rapid evolution of gas bubbles indicated that a decomposition was taking place. Until the eighth day the odors arising had not been very objectionable, and even at this time were not serious. After the ninth day the weather was very warm, until the morning of the twelfth day when the temperature dropped rapidly, but the progress of decomposition shown by the gas bubbles was as rapid as ever.

During the corn pack, the waste was liquid with a milky appearance and having occasional floating corn grains, corn silk and husks and cobs. The liquid becomes putrescent but slowly compared to domestic sewage. No improvement had been made in the irrigation beds since

the pea pack, except to drag down some of the high places in the southernmost unit. The other three had grown up in weeds and it was necessary to plow and harrow them again. The surfaces of all the beds were very uneven, so at the beginning of the corn pack a gang of men was put to work to get them leveled down in proper shape. It had already been found almost impossible to flood a whole bed with the pump and reservoir in use, so in establishing the level of the third bed it was decided to divide it in halves and then subdivide one of these halves into quarters. The labor of removing quite a large quantity of dirt was thus saved, for the dirt was used in the construction of the cross embankments. An elbow and a short length of pipe was attached to the discharge pipe in this bed, so that the discharge could be directed to any division of the bed by simply turning the pipe around.

Experiments were made to determine the quantity of waste a bed could absorb. Various rates of from 100,000 to 350,000 gallons per acre per day were tried. It was found that the lower figure gave the best results.

In order to determine the efficiency of the irrigation project, a number of test holes were dug with a post auger to a depth of about 4 feet at various distances from the bed. In digging, about 2 feet of top soil was first penetrated. Immediately below was a thin layer of yellow clay, followed by a stratum of coarse sand and gravel. A formation of sticky blue clay which was almost impervious to moisture underlaid the gravel; hence any drainage from the beds was forced to appear above this formation. Two holes were driven four feet from the bed and each succeeding hole 25 feet farther away. Samples were collected and tested from time to time.

Determinations made from samples collected from the test holes showed some contamination and, in holes near the beds, a high oxygen consumption.

Tests were also made to determine the value of contact beds and sand filters, the tanks being prepared as follows:

In tank No. 1 crushed rock of greatest dimensions from 1 to  $1\frac{1}{2}$  inches was placed until a depth of about  $2\frac{1}{2}$  feet was obtained. This was seeded with a bucket of sludge from the toilet room sewer and then dosed with the waste. No appreciable improvement or modification could be noted, though a contact of one, two and three hours, was tried.

For a sand filter, tank No. 2 was filled to a depth of about  $\frac{1}{2}$  foot with coarse gravel, then covered with a 3-foot layer of fairly coarse sand.

In order to duplicate to a certain extent the conditions represented by the irrigation beds, an earth filter was constructed in tank No. 3. About six inches of gravel was placed in the bottom, then dirt was added. This was rather firmly packed until a depth of  $2\frac{1}{2}$  feet above the gravel was attained, then an additional half foot was placed in the loose state.

The two filters were dosed at rates of 100,000 to 200,000 gallons per acre. The effluent in both cases had very slight color and turbidity and possessed a somewhat earthy odor. The sand filtration was more rapid than the dirt, and, apparently, a little more efficient, though the experiments were not continued long enough to obtain a good measurement of the efficiency of either. Both filters showed a tendency to improve with age. Unfortunately they were not started soon enough to give any conclusive evidence as to how long they could work without clogging, but there was no apparent decrease in their rate of absorption during the time they were in operation. In a general way, the use of contact beds does not appear promising, whereas sand beds may be used to great advantage where sand is available in sufficient quantity and at sufficiently low cost.

# The WEEK'S NEWS

**State Highway Work in California—The Year's Paving in Columbus, Salt Lake City, Newport, R. I., and Pittsburg, Kan.—Milwaukee Sewerage Commission—Boston Health Department Reorganization Proposed—Mosquito Extermination—Philadelphia Defeated in Light Case—New Charter Recommendations for Massachusetts Towns—Two Commission Victories—Milwaukee Street Cleaning—New Incinerators for Corpus Christi, Tex., and Greensboro, N. C.—Grade Crossing Elimination in New Jersey.**

## ROADS AND PAVEMENTS

### Proposes Convict Labor for California Roads.

Sacramento, Cal.—Convict labor to build the roads of California is the proposal of State Highway Commissioner Charles F. Stern, which will be introduced in the Legislature in a bill. The highway commission has been investigating the matter, gathering information from other states on the success of the plan. There are over 3,000 prisoners in the two penitentiaries of San Quentin and Folsom. The probable plan would be to use a large number of these in road work, caring for them in road camps, possibly under some sort of honor system such as was used in Nevada for a long time. Only those prisoners who could be trusted and had a good record would be allowed in the camps.

### Over \$1,000,000 for County Road Work.

Duluth, Minn.—In St. Louis County last year, \$1,106,778.55 was spent on roads according to figures which E. K. Coe, county road engineer, has prepared for the state highway commission. About half of this amount, \$545,000, was raised and expended by the county government. The remainder was made up from individual levies made by the several townships and the county's share of the state road apportionment. The largest piece of work for the year was the Duluth-St. Vincent road, which is 32 miles long and extends from the Miller Trunk road to the Aitkin County line. It will, when completed, represent a cost of \$150,000. The work accomplished in 1914 cost about \$95,000. The report shows that ninety miles of turnpike road was constructed at an average cost of \$1,300 per mile and that about fifty miles of road was surfaced with gravel. Five steel bridges were built at costs ranging from \$1,098 to \$8,368. Three reinforced concrete bridges costing from \$1,690 to \$4,296, were also constructed. Timber bridges were also constructed. St. Louis County has levied \$500,000 for roads this year.

### State Highway Surveys in California.

Sacramento, Cal.—State highway figures just completed show that location surveys have been completed on 2,063 miles of highways and that 1,063 miles of road are either completed or under contract. Awards are pending on seventy miles not included in the last figure. The Commission is closing the year by recording definite activity in every county in the state except San Francisco, which is not included, as state highway construction is omitted within the limits of incorporated cities. Much work is planned for the coming year on the mountain and other lateral roads. Surveys to Downieville, Bridgeport, Bishop, Auburn and in Southern California, as well as work farther advanced on the Oroville, Sonora, Colusa and Napa laterals, are reported.

### Kentucky University's Highway Course.

Lexington, Ky.—Road building in Kentucky received fresh impetus when about 65 men enrolled in the short course in highway engineering given at State University under the direction of Prof. D. V. Terrell, dean of the department of highway engineering. The address of welcome was delivered by W. E. Rowe, dean of the college of civil engineering. "The Need of a State and National Highway System" was the subject of an enthusiastic address delivered by Jesse Taylor, of Jamestown, O., editor of "Better Roads" and director general of the National Highway Association. Daniel B. Luten, consulting engin-

er of Indianapolis, gave an interesting and instructive illustrated talk on "Permanent Bridges," and Russell L. Morris, Professor of Highway Engineering, University of West Virginia, discussed road problems in two talks, "Earth Road Construction" and "Alignment and Grades of County Roads." After giving detailed instruction in field instruments and their use Professor D. V. Terrell took the field parties out for work.

Dr. I. L. Hewes, United States government engineer of Washington, D. C., gave an address on "Road Management and Gravel Roads," and said that the United States expends \$206,000,000 on public roads annually and that the reason this was not sufficient was that it passed through too many hands; that if the men in charge of public roads were better trained and better paid the results would be better roads. Prof. D. V. Terrell gave a technical talk on "Estimating Quantities on Construction," and M. D. Ross, assistant highway engineer of Frankfort, discussed the construction and use of the split-log drag and explained how they should be cared for and kept in condition. The program was concluded with a paper on "Drainage of Roads," by J. F. Grimes, assistant State highway engineer. Dr. Hewes delivered two more lectures on "Construction of Water-bound Macadam Roads" and "Economics of Road Building from an Engineer's Standpoint." Other speakers were J. F. Grimes on "General Methods of Maintenance and Repair;" Marion D. Ross on "Construction of Bituminous-Bound Macadam Roads," and President H. S. Barker on "The Relations of the State University to the State of Kentucky."

### County Work in Oregon.

Salem, Ore.—According to figures prepared by Insurance Commissioner Ferguson, a total of \$3,629,406.58 was expended on highways and bridges in the state from January 1 to September 30, of last year—\$3,369,788.78 on roads and \$259,617.80 for bridges. Multnomah leads in the expenditures for both roads and bridges.

### Year's Street Work in Columbus.

Columbus, O.—During 1914 the city engineering department expended \$1,682,202.23 in improvement work, including paving, sidewalk construction, sewer installation and viaduct work, according to a report made to Service Director Borden by Henry Maetzel, chief engineer. The city let contracts for 7.99 miles of cement sidewalks last year, at a cost of \$30,133.81. This is about 25 per cent of the sidewalk construction work carried on in the city in 1914. The department reports that 20,214 miles of public and private sewers were built at cost of \$298,075.80.

### Year's Improvements in Salt Lake City.

Salt Lake City, Utah.—Public improvements amounting to more than \$1,500,000, the biggest program ever undertaken in one year in Salt Lake, were completed by the city during this year. In addition, contracts were awarded for \$500,000 worth of improvements, and work is now under way on most of this. The figures have been compiled by Sylvester Q. Cannon, city engineer, for use in his annual report to the city commission. The year holds the record in mileage for paving, sidewalks, curbs and gutters, sewers and water mains, both in point of amount of work completed and the amount contracted for, to be completed next year. In addition to the street work there has been a vast amount of other public improvement work gotten under way, and some of it has been completed. Among these is the new comfort station at South Temple and

Main. Among the improvements that have been started and are now under way are the 20,000,000-gallon distribution reservoir on the Fort Douglas military reservoir, the dam which is to convert Lakes Phoebe and Mary into a vast storage reservoir, the dam which is to convert Twin Lakes into a storage reservoir, excavation for the dam in Parley's canyon, which is to create a storage reservoir of 1,002,000 gallons capacity, and two impounding and diversion dams at the Jordan narrows.

Paving laid and completed.....	11.5 miles
Paving unfinished .....	2.4 miles
Sidewalks, completed .....	19.9 miles
Sidewalks, unfinished .....	3.0 miles
Curbs and gutters, finished.....	13.5 miles
Sewers, completed .....	20.0 miles
Sewers, unfinished .....	55.0 miles
Water mains, laid.....	12.0 miles
Supply mains, completed .....	4.6 miles

#### Street Work in Newport, R. I.

Newport, R. I.—According to the annual report of the street commissioner, Newport has 91.62 miles of street, of which but 26.38 miles are dirt. There are 115.079 miles of sidewalk, 21.048 of which are granolithic and 84.266 dirt, the others being of various sorts. There are 59.593 miles of curbing and 49.932 miles of sewers.

#### Local Contractors to Build Bridges.

Miller, S. D.—A new system for building bridges in this county will be inaugurated after January 1. In the past the contracts were let to one big corporation that did all the work. The new board of county commissioners was elected largely on the bridge issue, and it is expected that the work will hereafter be let to local contractors, who may build one or more bridges or culverts, according to their ability to handle the work. The county may even assist a contractor in putting in a bridge by buying the material for him, if necessary.

#### Pittsburg, Kan., Street Work.

Pittsburg, Kan.—According to figures of City Engineer L. E. Curfman, during the year 1914 there were 3.45 miles of paving completed in the city. In addition to that 1.87 miles of new street are now being laid. This will be completed early this year and will make the total pavement laid since Jan. 1, 1914, a little more than five miles. Sanitary sewers built were 15,115 feet, or 2.86 miles, at a cost of \$12,858. Pavements finished were 18,239 feet, or 3.45 miles, or 51,282 square yards, at a cost of \$83,422. Curbing was 33,075 feet, or 6.26 miles, at a cost of \$18,202.71.

### SEWERAGE AND SANITATION

#### Work of Milwaukee Sewage Commission.

Milwaukee, Wis.—Mr. T. Chalkley Hatton, chief engineer of the sewage commission, reports that since Feb. 1, 1914, when the commission was organized, a laboratory and sewer testing station have been erected on Jones Island, and have been in operation since the middle of September. The processes being tested out consist of fine and coarse screening, aeration and sedimentation through slate tanks, sedimentation and sludge digestion through Imhoff tanks, chemical precipitation by means of lime and iron, sterilization by liquid chlorine, aeration and biological treatment by sprinkling filters, sludge drainage, sludge pressing and sludge disposition. It is expected that electrolytic treatment and new tank treatment with enforced aeration will be installed in the near future. Investigations have been carried on throughout the year to determine the volume of sewage contributed to the present sewers from the householder, industry, business house, hotels and other sources. To this end the flow in many of the most important sewers has been gauged for weeks at a time. A census has been taken of the population, number of dwellings, stores, factories and industries in each drainage district, and the surface occupied by such dwellings, etc.

Test borings have been made along the three river drainage districts to ascertain the character of the sub-strata in order to determine the most economical design for the intercepting sewers and their best locations. To this end

the location of all underground structures lying in the beds of those streets contiguous to the Milwaukee river have been obtained and plotted upon maps. All buildings abutting upon the streets in which the low level sewers have been located and the depth and character of cellars or basements observed and plotted. Surveys have been made and plans prepared governing the construction of an intercepting sewer along each side of the Milwaukee river.

The active organization of the commission embraces thirteen headquarters men consisting of engineers, draughtsmen, instrument-men and rodmen, and including the chief engineer and secretary to the commission, and fifteen men at the testing station consisting of chemists, bacteriologists, engineers and laborers. The force will be sufficient to operate the station to the end of the experiments with the addition of an assistant chemist and bacteriologist. The total cost of all work done, buildings erected and materials purchased to Dec. 31, has been \$70,977.50, divided as follows: Administration, \$2,822.39; preliminary engineering, \$27,602.84; laboratory, equipment and work, \$10,934.20; testing, station equipment and work, \$29,618.07.

#### Sewer System of Providence Cost \$17,300,000.

Providence, R. I.—The total cost of the sewer system of the city of Providence, from its beginning to Oct. 1, 1914, was \$17,376,088, according to figures contained in the annual report of City Auditor Chase. Receipts during that time have totalled \$3,168,898, leaving the net cost of the present system \$14,207,190. Expenses incurred in the development of the system are as follows: Construction, \$9,514,609; maintenance, \$2,533,258; interest on temporary loans, \$377,204; interest on bonds, \$4,951,016. The receipts are: Sewer assessments, \$2,697,583; sale of material, \$128,451; premiums on bonds, \$342,863. There was expended upon the sewer system during the fiscal year of 1914 a total of \$544,847, while receipts during the same period amounted to \$65,086.

#### Mayor Wants to Reorganize Boston Health Department.

Boston, Mass.—One health commissioner and five deputies is the form of the reorganization of the Boston Health Department which Mayor Curley asks the City Council to approve by the adoption of a new ordinance. Mayor Curley believes such an organization would be more efficient. The ordinance drawn by the corporation counsel is as follows:

Section 1. The health department shall be under the charge and control of a health commissioner, who shall be appointed by the mayor under the provisions of sections nine and ten of chapter four hundred and eighty-six of the Acts of the year 1909, and who shall receive an annual salary of \$7500.

Sec. 2. The health commissioner shall exercise the powers and perform the duties conferred or imposed by law upon the board of health of the city of Boston or upon the chairman thereof.

Sec. 3. The health commissioner shall establish the following divisions of the health department: Medical division, sanitary division, food inspection division, clerical division and quarantine division. Each division shall be in charge of a deputy commissioner, qualified by education, training or experience, who shall be appointed by the health commissioner. The salaries of the deputy commissioners shall be fixed by the health commissioner, subject to the approval of the mayor.

Sec. 4. All ordinances and parts of ordinances inconsistent herewith are hereby repealed.

Sec. 5. The provisions of this ordinance relating to the appointment of the health commissioner shall take effect upon its passage and all other provisions shall take effect when such appointment becomes operative.

#### Mosquito Extermination Work.

Elizabeth, N. J.—A report of the operations for the past three years as compiled by its chief inspector, Russell W. Gies, has been issued by the Union County Mosquito Extermination Commission. The report covers the period since May, 1912, when the commission was organized. In 1912 the appropriation for carrying on mosquito extermination work in Union county was \$28,000, of which \$15,000 was spent. Each year the appropriation has diminished, a 10 per cent. reduction being made for the coming year, the appropriation for 1915 being but \$23,000, as against \$25,500 last year. In spite of this reduction and in spite of the big increase in population in the county since 1912, necessitating greater efforts on the part of the mosquito extermination commission to control the various breeding places in the county, the amount of work that has been ac-

complished from year to year has vastly increased. The increase in the permanent abolition of mosquito breeding places, amounting to over 500 per cent. in two years, is very largely due to the activity of the local inspectors of the mosquito extermination commission, and the hearty co-operation of private owners throughout the entire area of Union county, in putting their premises in better sanitary conditions.

During the past year, although the cost of inspection decreased 11 per cent., the amount of work increased 8 per cent., a total of 221,517 inspections being made in 1914. In 1912 an average of 18 inspections a day were made, while in 1914, the average number of inspections had increased to 92 per day, at a cost of 15.1 cents in 1912 for each inspection, while the cost in 1914 had been reduced to 3.5 cents apiece. The commission now has about 710,000 feet of salt marsh ditching. This was maintained for the past year at about 0.4 cent per foot, a decrease of 28 per cent. from the cost of maintenance in the year previous. The commission on its new work has also been able to get more favorable prices from contractors, the last work costing but 1.9 cents per foot for ditching ten inches wide and thirty inches deep, whereas in 1912 the cost for the same ditching was 2.5 cents per foot. More than 139 large breeding areas, swamps, pools, ponds, etc., were drained or filled in, in 1912, while the number of such places had increased to 558 in 1914. Altogether 1,032 of these larger breeding areas were permanently drained or filled in, in the three years that the commission has been at work, and it will require but a small charge for each one of these places to maintain the ditching put in for draining. The oiling work of the commission has also shown a steady decrease in cost from year to year. In five months in 1912, \$2,106.04 was spent for temporary oiling work, while in 1914 only \$953.75 was spent. The one experienced man is doing the work each summer, which four men did in 1912, and the cost of wagons and other oiling equipment have also been cut down proportionately.

## WATER SUPPLY

### Main Under River Breaks.

Pittsburgh, Pa.—In order to alleviate conditions in the North Boroughs, including Bellevue, Avalon, Ben Avon Heights, Emsworth and West View, where the residents suffered from a water famine, due to a break in the two 12-inch feed pipes under the Ohio River, it became necessary to run a temporary water main across the High Bridge, from the city's main. The mains that burst are the property of the Ohio Valley Water Company, which gets its supply from artesian wells on Neville Island. As a result of the accident four of the public schools in the North Borough were forced to remain closed for a day. It was at first believed the broken mains could be repaired in a few hours, but this was found impossible on account of the high stage of the river.

### Norfolk, Va., Begins Metering.

Norfolk, Va.—Under the supervision of Engineer T. B. Dornin, in charge of the water department, installation of a portion of the approximately 5,000 water meters recently purchased by the city has begun. Under the plan submitted by Engineer Dornin and approved by the Board of Control, the first work will include the installation of 1,081 meters of the  $\frac{5}{8}$ -inch size.

### Water Works of Providence Profitable.

Providence, R. I.—Providence's municipally-owned water works returned to the city a net profit of \$305,590, after all payments for maintenance and interest had been made, during the fiscal year ending Sept. 30 last, according to figures contained in the annual report of City Auditor Chase. This is an increase of nearly \$40,000 over the net revenue obtained from the water works in the fiscal year of 1913, and is by far the largest profit the city has ever realized from the system. Receipts from all sources last year totalled \$843,154.28, while expenditures for interest, maintenance and depreciation, and extension amounted to \$537,563.39, leaving a net balance of \$305,590.89. The amount received for water rents was \$805,043.67, while sales

of material brought \$38,110.61 more. Interest charges for the year totalled \$109,900, about \$17,000 less than in 1913, while the cost of management and maintenance was \$288,571.43, a drop of \$36,000 from the 1913 figure. The depreciation and extension charges amounted to \$139,091.96. The total amount expended on the Providence Water Works since the beginning of the system is \$24,475,872.30, while the receipts have amounted to \$20,745,793.81, leaving the net cost of the water for construction, maintenance and interest, Oct. 1, 1914, at \$3,730,078.49. The reduction in the net cost of the system during the year was \$44,683. Expenses of the system since its beginning are as follows: Construction, \$7,071,283.41; management, \$6,324,817.05; interest on temporary loans, \$508,278.78; interest on bonds, \$10,571,493.06. Receipts up to Oct. 1 were classified as follows: Water rents, \$19,225,967.30; premium, less discount on bonds, \$92,774.96; sale of material, \$1,427,051.55.

### Railway Company May Not Operate Water Works.

Madison, Wis.—In an opinion to Secretary of State John S. Donald, Atty. Gen. Owen has held that he cannot give approval in their present form to the articles of incorporation of the Central Wisconsin Railway & Utilities Company. He says there is no statutory provision permitting a street railway company to operate a water company as outlined in the articles submitted. The opinion says, however, that where the water plant is incidental to the main business it may be permissible.

### Loses Fight to Buy Water Works.

Des Moines, Ia.—Des Moines lost a long fight to buy the city water works for the sum of \$2,302,522 when Federal Judge Van Valkenburgh of Kansas City held that the city could not be given an extension of the year's time to take over the plant set by Federal Judge McPherson, Dec. 3, 1913, and that as the time has expired the city had lost its rights granted by a special election under a state law. This leaves the case where it started over twenty years ago with the exception that the water works company holds that the city having once exercised its rights of eminent domain to condemn and take over the plant on appraised valuation fixed by the state supreme court cannot exercise the right again. Three special elections to buy the plant have been held following hot campaigns. The first two had a majority of the votes in favor of the purchase but not enough under the law which required a majority of the votes cast at the last general election. The third showed apparent victory for the municipal ownership, but there was delay in taking over the plant caused by failure to sell the bonds voted by the city. The city asked more time and has now been refused.

## LIGHTING AND POWER

### Philadelphia Loses Light Suit.

Philadelphia, Pa.—The United States Circuit Court of Appeals, in an opinion by Judge Wooley, affirmed the judgment of the District Court in which the Welsbach Lighting Company of America recovered a verdict for \$56,563.40 against the city, the amount representing fines which had been imposed for alleged failure to supply lights of the required candlepower. The city will now have to pay the claim unless an appeal to the United States Supreme Court is permitted. Failure by the city to follow the methods provided for in the contract for testing the candlepower of the lights is responsible for the verdict against it.

The specifications provided that all tests should be made by the city at regular stations, in accordance with the standard method; but on January 20, 1913, the company was notified that the city intended to make the tests of lamps on the streets with the lamps in place, stating, "we prefer to make this test with the glass housings on, although the contract states, 'and the test herein referred to shall be made with the clear glass globe which encloses lamps on the street removed'; we understand, however, that this provision may be waived by the written agreement of both parties. We recognize that a correction should be made for the absorption and reflection of the

glass housings, and we propose to obtain the value of this correction by means of a study of the net loss of light due to housings. We propose to use the average correction thus obtained in calculating the candlepower, not only of the lamps tested in January, but also of each lamp tested throughout the year." The company declined to consent to any change in the method of the testing from that prescribed by the specifications. The director went ahead, however, made the tests according to his ideas and imposed the heavy fines, which must now be paid over to the company.

#### Overhead Wire Elimination in Baltimore.

Baltimore, Md.—1,600,000 duct feet of conduit was installed by the Electrical Commission during the last year at a construction expense of \$576,391, according to Chief Engineer Raleigh C. Thomas. The average working force employed during the year was 550 laborers, and, in addition to the construction expense, there was also expended in construction salaries \$17,733.36 and for operating and maintenance \$12,966.67, the last item being taken from the tax levy. Since the beginning of the construction of the underground conduit system by the commission there have been removed from the streets approximately 9,000 wooden poles, while the total number of feet underground cable installed until the end of the last year has been 3,360,870.94 feet.

#### Gas Rates Reduced.

Evansville, Ind.—A substantial reduction in the price paid for artificial gas by domestic consumers at Evansville was granted by the public service commission at Indianapolis in an order just issued. The rate for all domestic consumers is reduced from 95 cents to 85 cents net for each 1,000 cubic feet. A reduction also is provided for larger consumers of gas. The Evansville gas property is owned by the Evansville Public Service Company. The decision in the Evansville gas case represents one of the most important which have been prepared by the public service commission. Besides reducing the meter rate, the commission provides that there shall be a minimum flat charge of 50 cents a month and it reduces the penalty which the company may assess against delinquent consumers from 15 to 10 cents for each 1,000 cubic feet. The valuation of the company's property for rate making purposes was fixed at \$750,000. The commission allows seven per cent as a fair rate of return upon this valuation. The new rates will become effective Jan. 1. The new schedule of rates ordered by the commission follows: 85 cents for each 1,000 cubic feet for the first 5,000 cubic feet. 80 cents for next 5,000 cubic feet. 75 cents for next 20,000 cubic feet. 65 cents for next 50,000 cubic feet and all amounts in excess thereof. The gas company will be required to pay into the state treasury \$3,013.10, which represents the expenses of the commission's auditors and engineers in conducting their investigations.

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## MOTOR VEHICLES

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#### Cost of Operating Auto Apparatus.

Schenectady, N. Y.—Chief H. R. Yates has reported to Commissioner of Safety Wemple comparative statement of the expense of maintenance of horse-drawn and motor fire apparatus, which shows a heavy balance in favor of the motor apparatus. During the months of October, November and December the two-horse combination wagons at Station 4 answered 14 calls and cost \$79.50, or 87 1/3 cents a day. The auto combination wagon at Station 1, in the same period, answered 42 calls and cost \$6.50, or 7 1/2 cents a day. The auto combination wagon at Station 2, in the same period, answered 33 calls and cost \$17.60, or 19 1/3 cents a day, of which \$10 was for a new fan and bracket for the motor. In the pumping equipment, the apparatus at Station 6, consisting of a three-horse steamer and a two-horse combination wagon, in same period, answered 14 calls, no water being pumped by the steamer, at a cost of \$205.25, or \$2.25 1/2 per day. The triple combination engine at Station 7, which combines on one chassis the pump, chemical equipment and hose of the Station 6 apparatus and also a ladder equipment, in the same period

answered 20 calls, pumped water three times and cost \$6.38, or 7 cents a day. These figures, in each case, allow for complete maintenance replacements and repairs, but not for wear, tear and depreciation.

The new auto combination wagon at Station 9, recently delivered by the American-La France Company, has been accepted by the city. The wagon has a six-cylinder engine, and carries, besides the hose and the chemical tanks, 30-foot and 24-foot extension ladders, 14- and 16-foot scaling ladders. The apparatus has several features that were designed by Chief Yates and which no other apparatus has been equipped with. There is a platform over the rear wheels on which firemen can ride; metal boxes for the rubber covers used to prevent damage to property at fires and for the coats and helmets of the firemen; a metal compartment for the chemical hose and an entirely exposed mechanism for operating the chemical tank. To accomplish this, the two front seats are separated, in one of which the driver sits and in the other the man operating the tanks.

#### Wants Complete Motorization.

Watertown, N. Y.—Within five years' time every piece of fire fighting apparatus in Watertown's department will be motor driven, according to a prediction made by Chief H. C. Bundy and backed by Commissioner Allen Dryden of the board of safety. It is stated that as fast as a piece of horse-drawn apparatus becomes worn out it will be replaced with motor-driven.

#### Police Captains Must Own Autos.

Chicago, Ill.—Captains in Chicago's police department must purchase automobiles and provide for their maintenance or lose \$750 of their annual salary, it has been recently ruled by Mayor Harrison after a conference with police officials. The annual salary of the captains was raised to \$3,000 last year with the understanding that each should purchase a motor car. Recently it was discovered that not a captain had purchased a car in compliance with the agreement.

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## GOVERNMENT AND FINANCE

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#### Charter Recommendations for Massachusetts Cities.

Boston, Mass.—Eleven recommendations, including that to abolish primary elections in cities, were made in the report filed with the incoming legislature by the special committee appointed last year to investigate and report on the subject of city laws and charters. No suggestions were made with regard to Boston, this city being exempted from the provisions of all drafts of the proposed legislation. The committee went on record as in favor of permitting cities desiring to change their forms of government, so far as it related to the chief executive and the legislative branch, to do so without recourse to the legislature by accepting any one of the four plans submitted. The proviso was made, however, that, should a city accept any one of the forms, it could make no further change for a period of at least four years. In the legislation proposed, the committee made provision that every city adopting the act might consolidate, abolish, rearrange or establish new departments by ordinance.

A majority of the committee was understood to favor the first plan outlined, providing for the election of a mayor, to be given absolute power in appointments, removals and veto, and a city council of nine members to be elected at large for terms of two years each. This is the so-called "responsible executive" type. The second plan would give the mayor the power of appointment, removal and veto, subject to the approval of the council. The council would be composed of not more than fifteen members, one to be elected from each ward of the city selecting the plan and the remaining members to be elected at large. Provision is made for the so-called commission form of government in the third plan. There would be five commissioners, one the mayor, to be elected at large for terms of two years each. The last arrangement, the so-called city manager plan, provides for a city govern-

ment consisting of a mayor and four councillors, the city manager to be elected by the council.

The committee recommended that cities might by ordinance rearrange, consolidate, abolish or establish subsidiary departments, prescribe the duties and powers thereof and fix the compensation and tenure of office of all officials not specifically provided for in the legislation it submitted. The report was in favor of prohibiting city officials from participating in contracts with cities. It favored publicity in making contracts and purchasing supplies. The last recommendation was that, in the taking of land for municipal purposes, the land must be taken by eminent domain if the price proposed is 25 per cent in excess of the valuation. Other recommendations included those providing that nominations of all candidates should be by petition with nothing but the name and address of candidates, either on the nomination paper or the ballot used at the city election; that voters might adopt ordinances through the initiative and referendum, and that cities might adopt a system of preferential voting in city elections. It was stated in the introductory portions that, while the report was based in general on the assumption that the principle of "home rule" for cities was sound, the committee was unwilling to record itself in favor of giving to any city absolute and complete authority to determine for itself all the questions which arise in connection with the administration of its affairs.

#### Commission Victories in Illinois Towns.

Sterling, Ill.—This city has adopted the commission form of government by a vote of 696 to 232. The women of the city played a large part in the election—out of 211 only 11 voted for the old ward form.

Rock Falls, Ill.—Rock Falls has voted in favor of the commission form by a vote of 263 to 177.

#### Montreal Sells Bonds.

Montreal, Canada.—The city of Montreal has accepted an offer of 98.671 and accrued interest for \$6,900,000 5 per cent three-year bonds from a syndicate headed by a Boston investment house. Four tenders from American firms were submitted through the Bank of Montreal, the city's agent. The bonds are dated Dec. 1, 1914, and were delivered on Jan. 15. The interest for that period, approximately \$43,000, is assumed by the purchasers in their offer and made their bid equivalent to 99.29.

#### A New City Job.

Fort Smith, Ark.—An office to be known as the municipal economist has been created by the city board of commissioners of Fort Smith. The municipal economist's duties consist in devising ways and means to reduce municipal expenses and increase municipal revenue.

#### Mayor Must Be a Doctor.

Santa Monica, Cal.—Santa Monica has limited the selection of the next mayor of the town to graduate physicians who have practiced five years. This unusual requirement is contained in the new charter amendments carried at the recent election giving the city a commission form of government. The new charter provides that the mayor shall serve as health officer, whose requirements include that he shall be a graduate of a reputable medical college and shall have practiced five years. The municipal election will take place December, 1915.

#### Cities Possess Sovereign Powers in Oregon.

Salem, Ore.—Cities possess absolute sovereign powers in the enactment of all municipal legislation and can enact both civil and criminal laws pertaining to municipal affairs without the slightest interference by the legislature, according to a decision rendered by the Oregon Supreme Court in the case of Peter Kalich v. F. C. Knapp. Knapp brought the action to recover damages for injuries sustained in a collision with an auto driven by the defendant in Portland, contending that the defendant was driving at an unlawful rate of speed. To prove negligence in that respect the plaintiff offered some ordinances of the city of Portland limiting the speed of vehicles. State Circuit Judge Henry E. McGinn sustained an objection to the introduc-

tion of these ordinances on the ground that they had been superseded by an act of the legislature known as the Oregon motor vehicle law. Last June Supreme Court Justice Charles L. McNary reversed the decision, and on a re-hearing majority members of the court upheld the reversal.

#### Cambridge, Mass., to Have City Advisor.

Cambridge, Mass.—President Richard C. MacLaurin of the Massachusetts Institute of Technology announces that Professor Charles M. Spofford, Hayward Professor and head of the Technology Department of Civil and Sanitary Engineering, has been named advisor for the city of Cambridge by the Institute. The appointment was made at the request of Mayor Good of Cambridge, who sought expert advice of Harvard and the Institute in some vexed matters of taxation. Harvard has already appointed Professor Charles J. Bullock, among the foremost of the authorities in the country on economics. Technology contributes to this advisory board an engineer, so that not only may the economic side be considered but that view which includes the practical and mechanical. Professor Spofford is a member of the firm of Fay, Spofford & Thorndike, consulting engineers in the proposed million-dollar improvement of the Quequechan River at Fall River.

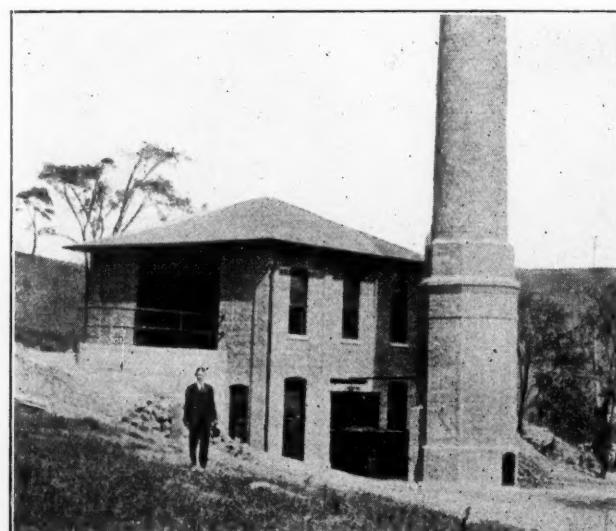
## STREET CLEANING AND REFUSE DISPOSAL

#### Street Cleaning Costs in Milwaukee.

Milwaukee, Wis.—According to a report of F. G. Simmons, commissioner of public works, the sum of \$232,652 was expended in cleaning the streets during 1914. The cost of snow removal was \$11,728. The quantity of garbage removed was 39,653.73 tons, and the cost of collecting was \$115,000. Ashes were removed from residences and other buildings at a cost of \$229,514. The number of loads removed was 101,776. Garbage was incinerated at a cost of \$66,000, or \$1.20 a ton. The department oiled 138 miles of streets at a cost of \$55,260. The total cost of street sprinkling was \$61,414.50. The street flushing expense was \$14,255. Work done by the department and assessed against property was worth \$8,297.

#### New Incinerator for Corpus Christi.

Corpus Christi, Tex.—The city council has closed a contract with the San Antonio Machine & Supply Company of this city to erect an incinerator of the Decarie type, at a cost of \$14,500. The plant will be built of brick and steel. The building and plant will be modern in every respect and will have a capacity of ten tons of dry garbage for each ten-hour working day, and the services of but one employee will be required. The plant is to be completed by March 1. The illustration shows the type of incinerator.



Courtesy, Corpus Christi (Tex.) Caller-Herald.  
TYPE OF NEW INCINERATOR FOR CORPUS CHRISTI.

**City Wants U. S. Government to Pay.**

Lawrence, Mass.—The municipal government and the federal government are at odds over a charge of \$24.12 for street watering in front of the postoffice here. Postmaster M. F. Cronin informed Mayor Kane he had received advice from Washington that the bill would not be paid, the contention being apparently that a municipality cannot tax the national government. The mayor thought the best way out would be to abate the sum, but Alderman Hannagan, who as director of engineering has charge of the water and street departments, demurred. He contended that it was not a tax, but a charge for service.

**State to Investigate City's Garbage Disposal.**

Muscatine, Ia.—The state of Iowa will try to provide a solution for the garbage disposal problem in Muscatine. Announcement has been made by City Engineer Young that the Technical Service Bureau of the Iowa State College has been instructed to conduct a garbage disposal survey in the city of Muscatine this year. Prof. Evinter, hydraulic and sanitary engineering expert, and D. C. Faber, industrial engineer, will visit Muscatine some time during the present month, at which time they will make preliminary plans for the survey. Through the survey the amount of garbage to be collected will be determined and the best plan of disposal as well as of collection will be determined also. Experiments are also to be made to determine the economic value of certain forms of garbage.

**New Incinerator Completed.**

Greensboro, N. C.—The incinerator ordered erected several months ago by the city commissioners has been completed and is now in operation. This incinerator, one of the very few in the state, or for that matter this section of the south, is located in the midst of one of the city dumping grounds for trash. Trash will be burned as rapidly as hauled and it is the opinion of men familiar with the operation of similar crematories that the city will have no trouble in disposing of the ashes as fertilizers. The guaranteed capacity of the Greensboro incinerator is 15 tons per day. It is guaranteed to burn trash, dead animals, up to and including a horse in size, and night soil or sewerage. The amount that can be burned is considerably in excess of the amount of trash that is daily being hauled from the city. The plant is a Nye Odorless Crematory erected by the Nye Odorless Crematory Co., Macon, Ga.

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**MISCELLANEOUS**

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**New Dams for Salt Lake City.**

Salt Lake City, Utah.—Construction work on the two new impounding and diversion dams built by Salt Lake and canal companies in the Jordan Narrows has been completed. The dams are of the radial gate type and the first of this design to be constructed in Utah, according to the city engineer, under whose direction they were erected. The dams instead of having gates that raise and lower perpendicularly are provided with circular gates. The gates are really segments of cylinders operating on pivots corresponding to the center of the circle of which they are arcs. The big impounding dam near the head of the narrows is shown in the accompanying illustration. It serves as the impounding and distributing dam for all the canals. The second dam, a smaller one, is for diversion purposes for the Salt Lake and Jordan canal, which is the city canal, and is located further down the river. The impounding dam, or Jordan narrows dam, as it is known, cost a little more than \$10,000, while the diversion dam cost about \$2,000. The cost of the dams was borne proportionately by the canal companies and the city.

**Grade Crossing Elimination in New Jersey.**

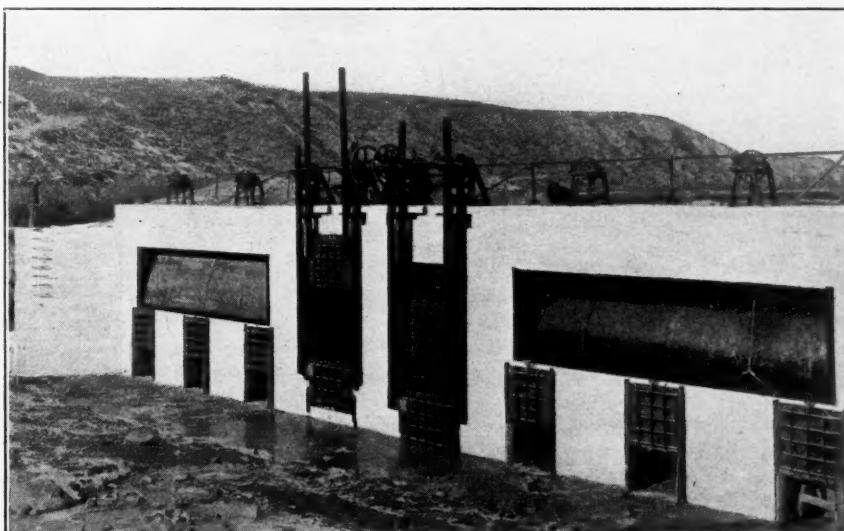
Trenton, N. J.—The work done by the state board of public utility commissioners toward the elimination of railroad grade crossings in the state is outlined in the annual report of the board, which has been filed with Governor Fielder for transmission to the legislature. The board reports that plans with estimates of costs involving the removal of 30 grade crossings in five municipalities have been prepared. The five cities which have applied for the removal are: Perth Amboy, Paterson, Cranford, East Rutherford and Newark. The report shows that the cost of the work called for by these plans would amount, in round figures, to \$4,000,000. During the year, the report shows, the Pennsylvania Railroad has made material progress in the elevation of its track through Rahway. Two additional tracks have been elevated and placed in service. The track elevation extends for about two miles, has eliminated 13 grade crossings and the expense of the work to date has been approximately \$1,600,000.

**City Reports to Be Made Interesting.**

Mason City, Ia.—Mayor Stanton and Commissioners William E. Miller and Harry E. Stanbery, forming the city council of Mason City, have decided that the pamphlet issued monthly and according to state law, accounting in detail for the city's business for the preceding thirty days, has in the past appeared too much like a dry and uninteresting "public document" to the citizens who regularly receive it. They concluded to dress it up a little and, commencing this month, it is appearing with the cover done in two colors and illustrated with a half-tone reproduction of some improvement of recent past or under way. In the future Mason City's monthly report will look like a neatly prepared magazine, instead of like a mass of statistics.

**City Plan Commission for Shreveport.**

Shreveport, La.—Carrying out a suggestion adopted by the Chamber of Commerce recently, the City Council has passed an ordinance creating an advisory municipal body to be known as the City Plan Commission. The following are named as first members of the commission: O. A. Wright, chairman; John D. Wilkinson, W. H. Werner, Andrew Querbes and H. L. Heilperin. Without compensation the City Plan Commission will provide plans for beautifying the city generally. It will develop a system of boulevards and parks in and around the city; will supervise and suggest plans for the use, improvement and adornment of the public parks and places, and will advise as to the formation and laying out and platting of subdivisions within and additions without the city. These duties are specified in the ordinance, which states that the council will approve no subdivision or addition until same has been submitted to the City Plan Commission.



Courtesy, Salt Lake (Utah) Herald Republican.

**SALT LAKE CITY'S NEW DAM.**

## LEGAL NEWS

### A Summary and Notes of Recent Decisions— Rulings of Interest to Municipalities

#### Public Improvements—Validity of Contract.

Williams et al. v. Ettenson et al.—Where the contract for a sewer referred specifically to the ordinance containing its description, the contract is not invalid because it did not call for the distance of the sewer.—Kansas City Court of Appeals, Missouri, 170 S. W. R., 370.

#### Obstruction of Street—Suit to Enjoin Issues and Proofs.

City of Portland v. Miller et al.—In a suit to enjoin the maintenance of buildings and fences across a street which had formerly been owned by defendants, testimony on behalf of defendants that they did not intend to dedicate the part of the street where their houses was situated is inadmissible, where it is not pleaded.—Supreme Court of Oregon, 143 P.R. 1006.

#### Streets—Grade—Original Establishment—Liability of Property Owners.

City of Louisville v. Lansberg.—In the absence of corruption or bad faith on the part of the officers of a city, no recovery can be had for consequential damages growing out of the original establishment of the grade of a street, but the damages may be recovered for negligent construction of the street on the established grade.—Court of Appeals of Kentucky, 170 S. W. R., 963.

#### Opening Street—Method of Assessment.

In re Blondel Ave. in City of New York.—Where, before the opening of a street, eight blocks long, from a railroad station to a subway station, part of its width was used for a street, though not legally opened, through the four blocks next to the railroad station, and the two blocks next to the subway station, but not through the remaining two blocks, each parcel should be assessed proportionately to the benefit received, disregarding the block by block rule.—Supreme Court, Special Term, New York County, 150, N. Y. S., 403.

#### Condemnation for Street—Railroad Right of Way.

Town of Eunice v. Louisiana Western Ry. Co.—The general authority vested in a municipal corporation to expropriate land for the opening or extension of a street is sufficient for the purpose of a suit against a railroad company for the extension of a street across its right of way and tracks, provided the company is not thereby deprived of the beneficial use of the land; and the fact that the municipality does not take, nor the company lose, the property altogether, but that, apart from the benefit that the company itself will derive from the use of the land, as a street, it will continue to enjoy the right to maintain and use its tracks thereon, is properly taken into consideration in determining the compensation to which it is entitled.—Supreme Court of Louisiana, 66 S. R. 257.

#### Board of Water Commissioners—Power.

West Jersey and S. R. Co. v. Board of Water Commissioners of Atlantic City.—Where the charter of a city provides for the appointment by it of a commission to have entire charge and control of the water-works system, and to that end to purchase necessary machinery, pipes, and all necessary materials for the maintenance, extension and improvement of such water works, upon condition, however, that no money shall be expended for any purpose other than that for which it shall be appropriated or designated by the city council, and that all disbursements on account of the water department shall be made by the city treasurer upon the warrant of the comptroller, and such commission is not authorized to prosecute or defend suits, nor to raise money either by taxation, assessments, or upon the credit of the city, such commission is not invested with corporate powers separate and distinct from that of the municipality, and it is therefore a mere agency of the city.—Court of Errors and Appeals of New Jersey, 92 A. R., 369.

#### Railroad Crossing—Change of Grade—Power of Municipality.

Southern Ry. Co. v. State.—A municipal corporation having full control over its streets, and the railroad crossings over such streets, can both alter the grade of the streets, and compel railroad companies maintaining overhead crossings to reconstruct such crossings to conform to the new grade.—Supreme Court of Tennessee, 169 S. W. R., 1173.

#### Railroads in Streets—Power of Cities.

South Atlantic Waste Co. v. Raleigh C. & S. Ry. Co.—Whether an abutter owns the fee of a street or not, the municipal authorities may permit a railroad company to lay its tracks therein, for in either case it only entitles the abutter to damages, imposing an additional burden if he be the owner of the fee, or, if not, destroying some of his rights as an abutter.—Supreme Court of North Carolina, 83 S. E. R., 618.

#### Bridges—Construction by City—Contribution by County.

City of Clinton v. Hickman County.—A county may be required to contribute its fair proportion to the erection and maintenance of bridges within the limits of small towns and cities, where the bridges, though not indispensably necessary, are situated on streets that connect with public highways of the county and are convenient for the people of the county in going to and from the courthouse and other public places.—Court of Appeals of Kentucky, 170 S. W. R. 11.

#### Damages—Liability of City.

Seewald v. Schmidt et al.—The defendants Madsen Bros. were operating a concrete mixer, for which a gasoline engine furnished the motive power, immediately adjacent to a public alley in the defendant city of Waseca, but not in the alley. The defendant Schmidt drove his team into the alley upon business and close to the engine. The horses became frightened and ran away and injured a horse of the plaintiff. It is held that the defendant city was not liable.—Supreme Court of Minnesota, 149 N. W. R. 655.

#### Violation of Ordinance—Sufficiency of Complaint.

City of Deadwood v. Coe.—A complaint charging the violation of an ordinance making it unlawful for any person to lease or occupy any residence building on land abutting on any street in which there was or should be any sewer main, unless such building was connected with the sewer main, as "now or hereafter provided by law or ordinance," without alleging that there was or had been any ordinance prescribing the manner of connecting the sewer mains, failed to state facts sufficient to constitute a violation of the ordinance.—Supreme Court of South Dakota, 149 N. W. R. 359.

#### Sidewalks—Liability for Defects.

Gottlieb v. City of New York et al.—Where plaintiff, in an action for damages from the collapse of a sidewalk, did not show that defendants, owners of the abutting property, had made the vault into which he fell, or had ever used it in connection with their building, or had any knowledge of its existence, or had violated any municipal ordinance, he could not recover, as the primary liability for damage occasioned by neglect to keep sidewalks in repair rests upon the municipality and not upon the abutting property owners.—Supreme Court, Appellate Division, First Department, 149 N. Y. S. 589.

#### Town Board—Meeting Outside Town.

People ex rel. Shields v. Watkins, Supervisor, et al.—Town Law (Consol. Laws, c. 62) section 131, requires at least two annual meetings of the town board at the office of the town clerk, and provides that special meetings may be called by giving two days' notice in person or in writing to the members of the time and place of such meeting. Held that, though with the exception specified meetings of the town board need not be held at the town clerk's office, yet, except as authorized by statute to be held outside the town, such meetings must be held within the town, and hence a meeting of the board to revoke an appointment of two election inspectors, and to appoint others, held outside the town, was illegal.—Supreme Court, Special Term, Washington Co., 149 N. Y. S., 1006.

**Authority of Municipality.**

Norfolk Southern Ry. Co. v. Morehead City.—Where a railroad right of way has become an established street of a city or town, it is subject to municipal regulations made in the reasonable exercise of police power for the public benefit, and an ordinance regulating the use of such right of way will not be enjoined, unless unreasonable.—Supreme Court of North Carolina, 83 S. E. R. 259.

**Injuries to Persons on Streets—Evidence—Jury Question.**

Markowitz v. Lindeman.—In an action by a street sweeper, who claimed to have been injured by an automobile, the questions of whether he was in fact struck, and whether the accident resulted from the negligence of the motorist, or his own contributory negligence, held for the jury.—Supreme Court, Appellate Division, First Department, 150 N. Y. S., 345.

**Public Improvements—Liability of City.**

Carruthers et al. v. City of Astoria et al.—In order to relieve a contractor of the duty to carry out his contract for a public improvement and to hold the city liable for the expense of the work done on the ground that the city determined that the manner of doing the work was dangerous to the adjoining property, it must be shown that it was an impossibility for the contractor to do the work otherwise in the manner being followed.—Supreme Court of Oregon, 143 F. R., 1106.

**Public Improvements—Liability of City.**

City of Jonesboro v. Hemingway et al.—Where the defendant city, which engaged plaintiff to do grading at a stipulated sum per cubic yard, allowed citizens to have the dirt removed on their paying the contract price, and plaintiff, without any arrangement with J., placed dirt removed upon his property under the direction of the city engineer, who thought J. would pay for it, there was no privity of contract between J. and plaintiff, and therefore plaintiff was entitled to recover compensation for removal from the city.—Supreme Court of Arkansas, 170 S. W. R. 82.

**Officers—Vacancies.**

McCrellis v. Curran.—As one appointed under the act of 1904 (P. L. p. 151), fixing the term of street commissioner of cities of the second class to three years, is entitled to hold for the full term, though appointed only to fill a vacancy, a declaration by the city council before the end of the three years that the office was vacant and the appointment of another is wholly void, and the second appointee, though he enters into possession of the office upon the subsequent resignation of the first, has no title.—Supreme Court of New Jersey, 92 A. R. 84.

**Streets—Equitable Estoppels.**

Booth v. City of Prineville.—Where persons inclosed a portion of a street and used it as corral for horses in the winter and for the growth of vegetables in the summer, but made no other improvements in the land, the city is not estopped to claim the street, the doctrine of equitable estoppel in such cases being based on the injustice to private parties who, relying for many years on the tacit acquiescence of public officers, have made permanent and valuable improvements of which they would be deprived by opening a highway.—Supreme Court of Oregon, 143 P. R. 994.

**Proceedings of Council—Veto Power.**

Attorney General ex rel. Morgan v. Hayes et al.—Under Laws 1911, c. 359, creating a board of public works for the city of Manchester, and providing that the members of the board shall be elected by the board of mayor and aldermen, and Pub. St. 1901, c. 47, Sec. 7, providing that the mayor shall have a negative upon the action of the aldermen in laying out highways and in all other matters, and that no vote can be passed or appointment made by the board of aldermen over his veto unless by a vote of two-thirds of all the aldermen elected, the mayor of Manchester has power to veto the election of a member of the board of public works by the aldermen.—Supreme Court of New Hampshire, 92 A. R. 166.

**Bond Election—Requisites of Ordinance and Proclamation.**

Humphrey v. Board of Commissioners of City of Pratt.—A city ordinance calling a bond election and the election proclamation need not contain information for the guid-

ance of voters not required by statute, and an issue of bonds to build a municipal light plant, authorized at a city election, cannot be enjoined because the ordinance and proclamation did not state that the proposed bonds would be paid by taxation.—Supreme Court of Kansas, 144 P. R., 197.

**Ordinances—Initiative and Referendum.**

State ex rel. Fleck v. Dallas City et al.—Under Const. art. 4, Sec. 1a, reserving to the legal voters of every municipality the initiative and referendum powers as to all municipal legislation, and article 11, Sec. 2, giving the legal voters of every city and town power to enact and amend their municipal charter, a provision of an ordinance, providing for the exercise of the initiative and referendum, but restricting the signing of initiative petitions to registered voters, is invalid.—Supreme Court of Oregon, 143 P. R., 1127.

**Power of Board—Employment of Attorney—Validity of Contract.**

McCormick v. Hanover Tp.—A contract between township supervisors and an attorney for legal services, to be rendered for a term commencing with a new fiscal year, when a new board would be in office, being beyond the board's power, was invalid, though under Act March 2, 1911 (P. L. 8), the member of the board, who would ordinarily have retired at the end of the year, was empowered to act for another year.—Supreme Court of Pennsylvania, 92 A. R., 195.

**Defective Crossings—Injury to Pedestrian—Liability of Election of Officers—Proceedings of Council.**

State ex. rel Burdick v. Tyrrell.—Where a ballot taken by the common council of a city for city attorney, resulting in three votes for one person, two votes for other persons, and one blank ballot, elected the person receiving the three votes, the election was not invalidated by the fact that the members of the council mistakenly held that he was not elected, nor by their vote to defer action upon the election of a city attorney.—Supreme Court of Wisconsin, 149 N. W. R. 280.

**Easements—Streets—Subsurface.**

Moffat et al. v. City and County of Denver.—Where a city granted to a water company an easement to lay and maintain its pipe line under a street, such grant was not absolute, nor did it give the water company a vested right to have its pipes remain undisturbed, but the right was subject to the right of the city to make such reasonable changes in the grade or improvement of the street as in its judgment the public interest demanded, and if such change required the removal or reconstruction of a pipe line over another route, the city was not liable to the water company for the resulting damage.—Supreme Court of Colorado, 143 P. R. 577.

**City Officers—Unauthorized Acts.**

Jones v. City of Caruthersville.—Since a municipality is liable for the acts of its officers and agents only when they act within the scope of their authority, a city was not liable for injuries to plaintiff's property by the acts of its city street commissioner in constructing a system of drainage whereby surface water was collected and thrown onto plaintiff's lot, to his damage, without any authorizing ordinance, and this though the city paid the street commissioner and his helpers for the work under a general appropriation ordinance.—Springfield Court of Appeals, Missouri, 171 S. W. R., 639.

**Discretionary Powers—Entrances Through Sidewalks.**

State ex. rel. McNerney v. Armstrong et al.—Under the statutes governing cities of the first class having more than 40,000 and less than 100,000 inhabitants, the matter of allowing and regulating entrances to basements through sidewalks is within the reasonable discretion of the mayor and council.—Supreme Court of Nebraska, 149 N. W. R., 786.

**Defects in Street—Notice of Defects.**

City of Ashland v. Boggs.—A municipality is not liable for injuries caused by defective streets, in the absence of actual notice of such defect, or unless it has existed so long that notice or knowledge thereof should be imputed, and notice will not be imputed where the defect is of recent origin, and particularly where it is in any way concealed.—Court of Appeals of Kentucky, 171 S. W. R., 461.

## THE MUNICIPAL INDEX

**In Which Are Listed and Classified by Subjects All Articles Treating of Municipal Topics Which Have Appeared During the Past Month in the Leading Periodicals.**

It is our purpose to give in the second issue of each month a list of all articles of any length or importance which have appeared in all the American periodicals and the leading English, French and German ones, dealing more or less directly with municipal matters. The index is kept up to date, and the month of literature covered each time will be brought up to within two or three days of publication. Our chief object in this is to keep our readers in touch with all the current literature on municipal matters. In furtherance of this we will furnish any of the articles listed in the index for the price named after each article, except that where an article is continued in two or three issues of the paper, the price given is for each of said issues. In addition to the titles where these are not sufficiently descriptive or where the article is of sufficient importance, a brief statement of its contents is added. The length also is given, and the name of the author when it is a contributed article.

### ROADS AND PAVEMENTS.

**Highways and Byways.** Elements tending to destroy the road surface and some English methods of building to resist destruction. By W. Gregory, District Surveyor, Herts, 1,500 words. The Surveyor, December 11. 40 cts.

Progress in Highway Administration During 1914. By J. E. Pennybacker, Chief of Road Economics, U. S. Office of Public Roads, 2,000 words. Engineering Record, January 2. 10 cts.

Efficiency of Highway Construction. Figures showing the cost of maintenance compared with the first cost. By Col. E. A. Stevens, State Highway Commissioner of New Jersey, 2 ills., 2,500 words. Southern Good Roads, December, 10 cts.

Location and Width of Highways and the Securing of Rights-of-Way. From paper by Austin B. Fletcher before American Road Congress, 3,300 words. Engineering and Contracting, December 2. 10 cts.

Location and Construction of Highways in Mountain Country. Peculiar problems in highway construction in the Western States; an argument against maximum 5 per cent. grade and expensive construction; the type of equipment best suited for the work. By F. W. Harris, 7 ills., 2,600 words. Engineering News, December 17. 15 cts.

Road Improvements. Address by W. A. McLean before the American Road Builders' Association. Touches on bond issues, "permanent roads" and town planning, 3,500 words. Canadian Engineer, December 31. 15 cts.

Improving Ordinary Country Roads. An argument in favor of more mileage at less cost, and the detailed illustration of what may be accomplished by relatively small expenditures on surfaces for light volume of mixed traffic. By S. P. Hooker, State Superintendent of Highways of New Hampshire, 3,200 words. The Canadian Engineer, December 10. 15 cts.

Some Requirements of Road Specifications with Special Reference to Rolling. Gives examples of good and faulty rolling specifications, 2,500 words. Engineering and Contracting, December 23. 10 cts.

American Road Builders' Association. Extracts of papers by William D. Uhler on Bituminous Construction, by J. A. Johnson on Road Foundation, by Clifford Olden on Floors for Bridges, by H. J. Kuelling on Concrete Roads, 5,400 words. Engineering Record, December 19. 10 cts.

How the Georgia Good Road Movement Was Stimulated. By S. W. McCallie, State Geologist, 1,700 words. Southern Good Roads, December, 10 cts.

Review of Road Work in the United States During the Present Year and Forecast of Work in 1915, as reported by states, 11,000 words. Good Roads, December 5. 10 cts.

Road Building with Industrial Equipment. Use of dinky cars hauled by 20 horse-power locomotives in handling materials, 3 ills., 1,200 words. Engineering Record, December 5. 10 cts.

Storm King Road. Description of the difficulties that will be encountered in the construction of the road across the face of Storm King Mountain, 3 ills., 2,000 words. New York Highway News, December, 10 cts.

Roadway on the Palisades. Description of work on which retaining walls, some 40 feet high, were required throughout; grades from 7 to 8½ per cent. on entire work; construction details and cost, 8 ills., 4,000 words. Municipal Journal, December 31. 10 cts.

Road Materials of Tennessee. Description of the rock suitable for road building; its occurrence, and the distribution of sand, clay and gravel. By A. H. Purdue, 2,000 words. Southern Good Roads, December, 10 cts.

Ripping up Concrete Foundations with Revolving Shovel. Concrete roadway foundation 20 ft. wide and 600 ft. long torn up in one day; approximate costs, 1 ill., 300 words. The Excavating Engineer, December, 10 cts.

Pavements for Small Cities, 800 words. Municipal Journal, December 31. 10 cts. Paving Procedure in American Cities. Methods of ordering pavements, paying for them and selection of materials, 1,900 words. Engineering and Contracting, December 16. 10 cts.

Paving Problems and Experience in San Francisco. Special rough brick on steep grade; rock asphalt and basalt block pavements. By James M. Owens, assistant city engineer, 4 ills., 1,500 words. Engineering News, December 10. 15 cts.

Heavier Foundations for Pavements. Editorial, 700 words. Municipal Journal, December 31. 10 cts.

Examination of Akron Pavements. Determining amount of repairing and rebuilding necessary; regulation of pavement openings; necessity of traffic census, 1,500 words. Municipal Journal, December 31. 10 cts.

Paving in Salt Lake City. Rock asphalt from California and Utah, both limestone and sandstone; sheet asphalt using Gilsonite; sidewalk construction, 1,500 words. Municipal Journal, December 31. 10 cts.

Paving Work in Meadville. Brick pavement and concrete curb; selling bonds; early planning of work. By B. F. Miller, Jr., City Engineer, 1,000 words. Municipal Journal, December 3. 25 cts.

Maintenance and Repair of Pennsylvania State Roads. Gives in detail instructions to employees concerning the maintenance and repair of various kinds of road, 5,000 words. Engineering and Contracting, December 23. 10 cts.

Road Maintenance. Abstract of paper by Wm. D. Sohier, chairman, Massachusetts State Highway Commission, before Fourth American Road Congress, 3,000 words. Municipal Journal, December 31. 10 cts.

Maintenance of Earth Roads. Importance of maintenance; factors of drainage; exclusion of vegetable matter; use of mechanical devices; notes on organization and control. Paper by Geo. W. Cooley, 1,500 words. Canadian Engineer, December 3. 15 cts.

Maintaining Macadam Streets in Kansas City. Experience with pure asphaltic oils and continuous maintenance. By C. R. Mandigo, 2,000 words. Engineering Record, December 12. 10 cts.

Traffic and the Methods and Cost of Road Maintenance in Massachusetts, and comparison with English and French conditions. Gives tables of average costs and traffic. From paper by W. D. Sohier, Chairman, Massachusetts Highway Commission, 11,000 words. Engineering and Contracting, December 30. 10 cts.

Practical Hints on Proper Methods of Maintenance for Concrete Pavements. By William M. Kinney, 3 ills., 1,500 words. Engineering Record, December 12. 10 cts.

**State Aid Roads in Cook County, Ill.** Construction details, cost and equipment, 4 ills., 3,000 words. The Contractor, December, 20 cts.

State Aid to Town Highways. Description of the methods used in New York State with formula for equalizing valuation. By Walter F. Willson, N. Y. State Highway Department, 1 ill., 1,000 words. New York Highways News, December, 10 cts.

Washington State Highway Department. By William P. Roy, State Highway Commissioner, 1,500 words. Pacific Builder and Engineer, December 19. 15 cts.

Highway Work in Illinois. Organization of the State Highway Department; work done during the year, 7 ills., 4,500 words. Good Roads, December 5. 10 cts.

**Bituminous Macadam Roads in Rhode**

Island. Report of experiment made with test sections of bituminous macadam roads laid in 1906 and 1909. By I. W. Patterson, chief engineer, 3,600 words. Municipal Engineering, December, 25 cts.

Recent Practice in Bituminous Construction and Maintenance. By William D. Uhler, Bureau of Highways and Street Cleaning, Philadelphia, 3,100 words. Contract Record, December 16. 15 cts.

Improved Road Surfacing in Grangemouth. Result of experiments with tar sprayed macadam laid by three different methods, 2 ills., 4,000 words. The Surveyor, November 27. 40 cts.

Bituminous Materials for Road Construction. Relates to census of traffic and collection and standardization of cost data and methods of construction and maintenance, 3,900 words. Canadian Engineer, January 7. 15 cts.

Repairing and Resurfacing Bituminous Pavements. A cheap but effective method of repairing bituminous pavements with previously prepared material; resurfacing by flush coat of cold oil. By Samuel H. Lea, 2 ills., 2,000 words. Engineering News, December 31. 15 cts.

New Specifications for Broken Stone Roads. For broken stone roads with bituminous surface and bituminous macadam pavement. By Geo. D. Steele, 3,500 words. Better Roads and Streets, December, 15 cts.

Methods and Cost of Constructing a Bituminous Carpet on Concrete Roads. Notes on General Maintenance. By F. W. Whitlow, superintendent of construction, 1,200 words. Engineering and Contracting, December 16. 10 cts.

**Granite Block Pavement, Small.** As laid in three cities; comparative costs; methods of laying, in Louisville, Ky.; Danville, Va., and Salisbury, N. C. 4 ills., 2,000 words. Municipal Journal, December 3. 25 cts.

Paving with Redressed Granite. The methods of construction used at Albany, whereby a saving of \$1.40 a square yard was effected, 3 ills., 1,500 words. Municipal Journal, December 3. 25 cts.

**Wood Block Expansion Joint for Concrete Alley Pavements.** 400 words. Engineering Record, December 26. 10 cts.

**Concrete Roads—Their Design, Specifications and Present Status.** The second of two articles by A. A. Young, 1,500 words. Contract Record, December 2. 15 cts.

Concrete Road Construction. Covers road bed, width, and thickness of wearing coat, coarse and fine aggregate, cement, reinforcement and mixing, placing, finishing and curbing. By H. J. Kuelling, 2,000 words. Contract Record, December 30. 15 cts.

Concrete Pavement Design. Comments on the size of slab in which cracks did not appear, and outlines the development of concrete roads, 2,200 words. Engineering and Contracting, December 16. 10 cts.

Detail Construction Methods and Costs of a Long Section of Concrete Highway in California. By Geo. D. Steele, 6 ills., 8,000 words. Better Roads and Streets, December, 15 cts.

The Economy of Concrete Roads. Cost of construction and cost of maintenance given. By W. A. McIntyre, 2 ills., 1,500 words. The Highway Contractor, December, 10 cts.

**Brick Roads and Streets.** By John Laylin, Ohio State Highway Department, 2,000 words. Municipal Engineering, January, 25 cts.

Brick Highways in King County, Washington. 22 miles built in past three years; specifications; construction methods; other kinds of surfacing. By F. W. Allen, 8 ills., 2,500 words. Municipal Journal, December 3. 25 cts.

Vitrified-Brick Pavement on an Old Macadam Base, Carlisle, Pa. By John C. Hiteshew, city engineer, 2 ills., 900 words. Engineering News, December 24. 15 cts.

**Some Practical Notes on Brick Road Construction.** Discusses drainage, grading, concreting, culling brick and rolling and grouting. 2,200 words. Engineering and Contracting, December 9. 10 cts.

**Asphalt Block Pavement,** Thin, in New York City Highways. Use of blocks 2 inches thick; special joint to prevent creeping on curves. By Lowell Grossman. 3 ill., 1,800 words. Engineering Record, December 12. 10 cts.

Stone-Filled Asphalt Surface of Fine Asphalt Concrete. Experiences with mixtures laid in sixty-five cities. By Clifford Richardson, Barber Asphalt Paving Company. 1,250 words. Engineering Record, December 12. 10 cts.

Patching Sheet Asphalt with Bituminous Concrete. Describes plant, crew and methods; use of a hot mixer. 1 ill., 900 words. Engineering and Contracting, December 23. 10 cts.

**Resurfacing an Old Concrete Road.** Mixture used in reconstruction of surface of old road; method of mixing and laying and force employed. 2 ill., 1,100 words. Municipal Journal, December 31. 10 cts.

Resurfacing Old Macadam Roads with Warrenite. Gives specifications for this work. 14 ill., 6,000 words. Good Roads, December 5. 10 cts.

Methods and Cost of Removing an Asphaltic Macadam Road Surface, Reworking the Old Material and Relaying it as an Asphaltic Concrete. Reduces the cost of each item to the square yard basis. By G. C. Dillman. 5 ill., 1,500 words. Engineering and Contracting, December 9. 10 cts.

Unit Costs of Resurfacing Portions of the Niagara River Road, Queen Victoria Park, Canada. 1 ill., 1,400 words. Engineering and Contracting, December 9. 10 cts.

**Cost Figures on Several New Jersey Roads Built in 1913.** Cost data on fourteen roads, of average length. 4,000 words. The Contractor, December 20 cts.

Expenditures for Permanent and Perishable Features of Roads. Percentages of total cost which should be applied to foundations, drainage, structures, alignment and grades. 1,250 words. Engineering Record, December 12. 10 cts.

Day Labor Versus Contract System of Road Building. From a paper by A. R. Hirst before the Northwestern Road Congress. 3,500 words. Better Roads and Streets, December. 15 cts.

Trucks and Trailers in Road Building Test. Auto truck with four dump wagons, two trailing and two loading, demonstrates large profit in hauling gravel. By H. A. Farrington. 5 ill., 4,000 words. Better Roads and Streets, December. 15 cts.

**Traffic Statistics and Their Import in the Financing of Road Improvement and the Selection of Pavements.** Ed., 1,600 words. Engineering and Contracting, December 9. 10 cts.

Heavy Traffic Roads. By Henry G. Shirley, Chief Engineer, Maryland State Roads Commission. 2,500 words. Southern Good Roads, December. 10 cts.

The Life of English Roads as Determined from Traffic Statistics. Determined from observations extending over a long period of years. 1,000 words. Engineering and Contracting, December 23. 10 cts.

**Convict Labor on Country Road.** Arguments in favor of using county jail and state prison inmates as laborers on the construction and maintenance of country roads. By Geo. C. Warren. 12 ill., 2,500 words. Municipal Engineering, January. 25 cts.

Road Building by Convict Labor. Survey of the work done in those states which employ convict labor. 11 ill., 7,000 words. Good Roads, December 5. 10 cts.

**Street Crossing Under Milwaukee River.** General description of layout with drawing. 3 ill., 1,200 words. Engineering Record, December 5. 10 cts.

Heavy Street Cut at Kansas City. Description of new improvement in connection with a new union station. 3 ill., 1,200 words. Engineering News, December 10. 15 cts.

Widening a Business Street at St. Paul. Moving back the building line 20 feet on one side of the street. 1 ill., 900 words. Engineering News, December 31. 15 cts.

**Gravel.** Use and Tests of Unscreened; Illinois State Highway Department. New tests usually made in field with portable apparatus; use of unscreened gravel for bridge concrete. By Clifford Older, bridge engineer, Ill. State Highway Dept. 2 ill., 1,800 words. Engineering News, December 17. 15 cts.

**Sidewalk Laying at Malden, Mass.** Critical Discussion of. By D. J. Hauer. 2,500 words. The Contractor, December 15. 20 cts.

#### SEWERAGE AND SANITATION.

**Sewage Disposal** at Bloomington. Concentric arrangement of sedimentation tanks, contact beds, sprinkling filters and settling basin. 1,500 words. Municipal Journal, December 17. 10 cts.

Sewage Works Operation. Report of Committee of American Public Health Association; tests to be added to the "standard methods." 1,500 words. Municipal Journal, December 14. 10 cts.

Small Sewage Treatment Plant. 10,000 gal. plant, consisting of Imhoff tank, dosing chamber, percolating filter, secondary tank and sand filter. By P. E. Mebus and F. R. Berlin. 4 ill., 2,500 words. Municipal Journal, December 17. 10 cts.

Operation of Sewage Disposal Plants. The twelfth and last installment of a series of articles by F. E. Daniels. 3,500 words. Municipal Journal, December 17. 10 cts.

Recommended General Procedure in Sewage Works Operation. Discusses skilled supervision, record keeping and neatness. 1,400 words. Engineering and Contracting, December 16. 10 cts.

New Sewage Disposal Plant at Aberdeen, S. D. Details of Design, Construction, operation and cost, with points of practical interest brought out in a discussion of the system. By W. G. Potter. 15 ill., 2,000 words. Contract Record, December 2. 15 cts.

Sewage Intercepting Chamber and Settling Tank for Public Institution at Geneva, Ill. 1 ill., 600 words. Engineering News, December 17. 15 cts.

Advances in Sewage Disposal in 1914. By George W. Fuller. 2,000 words. Engineering Record, January 2. 10 cts.

Economics of Sewage Filters. Sand, contact and sprinkling filters; population per acre of filter practicable; cost per acre and per capita; economical depth. Abstract of paper by Geo. W. Fuller. 2,000 words. Contract Record, December 2. 15 cts.

Design and Maintenance of Sewage Treatment Works. A condensation of the progress report of the Committee on Sewage Disposal of the American Public Health Association. 1,700 words. Engineering News, December 17. 15 cts.

Preliminary Report on Emscher Tanks and Kindred Sewage Clarification Processes. Abstract of translation of the German report on the various phases of Imhoff and other tank treatment. By Dr. K. Thumm and Dr. E. C. Reichle. 2,900 words. Engineering News, December 31. 15 cts.

Design of Two Residential Sewage Treatment Plants, Including Settling Tanks of the Imhoff Type. Gives plans of each. 5 ill., 6,500 words. Engineering and Contracting, December 16. 10 cts.

Design, Maintenance and Operation of Plants for the Treatment of Sewage. Describes patented processes, ordinary processes and disinfection. 2,200 words. Canadian Engineer, December 31. 15 cts.

Sewage Screen at Daytona. Description of plant and screens; pumping station and air lifts. 1,000 words. Municipal Journal, December 17. 10 cts.

Aeration Experiments with Activated Sludge. Description of the work done at Salford, England. By W. H. Duckworth. 1,500 words. The Surveyor, December 11. 40 cts.

Method of Treatment of Sewage Sludge. A detailed study of the several methods of sludge treatment from a paper by Peter Gillespie. 5,000 words. Canadian Engineer, December 24. 15 cts.

**Trades Waste.** Disposal of. Describes the wastes from various manufacturing plants with possible methods of treatment or purification. By J. W. Sheridan. 3,000 words. Contract Record, December 16. 15 cts.

**Sewer** Cleaned with Scrapers to Pass Ball Test. Description of the scraper and parachute rope drag and table of itemized cost for cleaning 7.3 miles of sewer from 8 to 18 inches in diameter. By C. A. Bryan. 1 ill., 1,800 words. Engineering Record, December 26. 10 cts.

Excavating and Backfilling Sewer Trenches by Machine. Detailed cost and explanation of methods used in excavating in narrow streets. 2,000 words. Engineering Record, January 2. 10 cts.

Investigation of Sewer Air Following Boston Explosion. Methods and results of sampling and testing pure air and experiments with gasoline vapor. By H. W. Clark. 1,300 words. Engineering Record, December 5. 10 cts.

Construction of the Metcalf Avenue Sewer, Borough of Bronx, New York. Pile foundations; description of mixer equipment and construction plant. By G. L. Christian. 7 ill., 1,800 words. Engineering News, December 10. 15 cts.

Preliminary Work to be Done in Starting a Sewer Contract. 3,000 words. The Contractor, December. 20 cts.

**Drainage** Ditches, Digging 624 Miles of. Methods used in the construction throughout the Mississippi Valley. 6 ill., 3,000 words. The Contractor, December. 20 cts.

Concrete Pipe. Use of poured concrete pipe in drainage work in Washington. 1,500 words. Cement and Engineering News, December. 10 cts.

#### WATER SUPPLY.

**Water Supply** Main for Atlantic City, N. J. Method of carrying main across salt meadows; protection from corrosion. 4 ill., 1,000 words. Municipal Engineering, December. 25 cts.

New Intake Tower and Tunnel at St. Louis Water Works. Construction details; method of work and description of plant. 8 ill., 6,000 words. By Edward C. Davis, engineer St. Louis Water Department. Journal of the Association of Engineering Societies, December. 30 cts.

Water Works at Lancaster, Pa. Extract of annual report. 2 ill., 2,000 words. Fire and Water Engineering, November 25. 10 cts.

Progress in Water Supply During 1914. By Allen Hazen. 1,500 words. Engineering Record, January 2. 10 cts.

Public Water Supplies for Cities—Some General Considerations. Covers source of supply, purification and conditions governing choice of supply. By W. H. Dittoe. 3,000 words. Water and Gas Review, December. 20 cts.

Purification and Protection of Water Supplies. Comparative typhoid statistics from American and European countries; purification and pollution of supplies. By John W. S. McCullough, Health Officer for Ontario. 5,500 words. The Municipal World, October. 10 cts.

Design Features of the Proposed Water Supply and Purification Works at Corpus Christi, Tex. Illustrates and describes new intake, combined suction well, coagulation and sterilization chambers and wash water tanks, and the manufacture of reinforced concrete pipe by the "jagger" process. 4 ill., 2,000 words. Engineering and Contracting, December 30. 10 cts.

Improvements to Youngstown Water System. Entire new system with exception of water mains is being installed at a cost of about \$600,000. 3 ill., 1,200 words. Fire and Water Engineering, December 30. 10 cts.

New Water Works Extension in Baltimore. 6 ill., 3,000 words. Water and Water Engineering, December 15. 15 cts.

Design and Construction of the North Side Reservoir of the Pittsburgh Water Works. Complete description of plant, methods of construction and equipment used. 2 ill., 5,000 words. Engineering and Contracting, December 23. 10 cts.

Greater Winnipeg Water Supply from Shoal Lake. Covers detail of construction, sections of aqueduct and methods of placing material. By D. McLean. 7 ill., 2,100 words. Contract Record, December 2. 15 cts.

Municipal Ownership and Operation of Water Works. By M. N. Baker. 1,200 words. Engineering News, December 3. 15 cts.

Geneva Water Improvements. Description of the works at Geneva, N. Y.; amount of water used and cost of operation. Fire and Water Engineering, December 23. 10 cts.

Chicago Water Works Notes. Use of pressure reducing valves; trench excavating by machine; testing mains. 3 ill., 1,700 words. Municipal Journal, December 17. 10 cts.

**Accounting**, Water Works. By R. A. Stevenson. 3,800 words. Fire and Water Engineering, December 16. 10 cts.

Observations on Water Works Valuation. Discusses the percentage for promotion, organization, engineering, financing, legal construction plant and other items. 5,800 words. Engineering and Contracting, December 16. 10 cts.

Discussion of the Elements of Water Works Accounting. Discusses the poor and indifferent accounting carried on in the average water utility, and outlines the elements of the subject. 3,000 words. Engineering and Contracting, December 30. 10 cts.

**Filter** Plant, Small Slow Sand for the Estate of J. P. Morgan. 2 ill., 900 words. Engineering News, December 3. 15 cts.

Water Filtration at Salisbury Plain. 650 words. Canadian Engineer, January 7. 15 cts.

Water Filtration Hold-up at Ottawa, Canada. Legal difficulties described. 1,000 words. Engineering News, December 10. 15 cts.

Water Sedimentation, Coagulation and Mechanical Filtration at Waco, Texas. Description of a very complete plant; automatic control throughout. 1 ill., 1,800 words. Engineering News, December 10. 15 cts.

Result of Task Work in Cleaning Filter Sand at Philadelphia. Resulted in an increase of 15 per cent. in the output. 3,300 words. Engineering Record, December 5. 10 cts.

Selection and Use of Concreting Materials at McKeesport Water Softening and Filtration Works. 1,500 words. Cement and Engineering News, December 10. 10 cts.

**Standard** for Drinking Water. Maximum limits of permissible bacterial impurity, adopted by the Treasury Department for water served by common carriers. 1,100 words. Municipal Journal, December 24. 10 cts.

Bacteriological Standard for Drinking Water on Common Carriers. 1,500 words. Engineering Record, December 5. 10 cts.

Relations Between Water Supply and Typhoid Fever in Washington, D. C. By John Gaub. 5 ill., 1,500 words. Journal of the American Water Works Association, December. 50 cts.

Dangerous Fire Connections. Their relation to typhoid fever epidemics. 1 ill., 600 words. Municipal Journal, December 24. 10 cts.

**Meters**, Requiring Consumers to Install. Gives court decisions on the power of municipalities owning water works to compel consumers to install and pay for water meters. By John Simpson. 2,000 words. Municipal Journal, December 24. 10 cts.

Experience of a Small City with Water Meters and Water Rates. By C. J. Renner, C. E., St. Albans, Vt. 3 ill., 2,500 words. Water and Gas Review, December. 20 cts.

Successful Application of the Bonus System in Paying Water Meter Readers at Milwaukee. 1,500 words. Engineering and Contracting, December 16. 10 cts.

**Gates and Hydrants**, Care of. From paper by Patrick Gear before New England Water Works Assn. 6,000 words. Water and Gas Review, December. 20 cts.

Spacing of Fire Hydrants. Discussion on the proper spacing for various pressures and conditions, and the effect of height of streams with different lengths of hose. By T. E. Sears. 4 ill., 2,500 words. The Fire Engineer, December. 10 cts.

**Reservoir** Bottoms on Stored Water, Influence of. Stripping reservoir bottom of organic matter may not permanently prevent bad taste and odors. Describes stripping of swampy areas of Kensico reservoir and covering with soil from nearby borrow pits. By Wilson F. Smith. 5 ill., 2,000 words. Engineers News, December 31. 15 cts.

Concrete Work on New Reservoir of the Montreal Water & Power Company. Description of methods and equipment. 5 ill., 1,500 words. Contract Record, January 6. 10 cts.

British Practice in the Design of Reinforced Concrete Reservoirs. Has special reference to plan, waterproofing, tiers, grouting, roofs, reinforcement and walls. 2,500 words. Engineering and Contracting, December 2. 10 cts.

**Mains**, The Cleaning of Water. Gives the principal methods now in use and the difficulties and expense to be met in cleaning systems of pipe not originally designed for easy cleaning. By J. F. Springer. 5 ill., 1,300 words. Municipal Engineering, January. 25 cts.

Method and Cost of Constructing and Repairing Submerged Water Pipe Line at Portland, Oregon. Gives methods and costs of laying 28-inch cast-iron and 24-inch steel flexible joint pipe lines, and illustrates two types of flexible joint used. 5 ill., 6,500 words. Engineering and Contracting, December 9. 10 cts.

Water Works Service Pipes. Some points brought out in the discussion of this subject at the New England Water Works Association. 1,000 words. Contract Record, December 23. 10 cts.

48-Inch Cast Iron Force Main for Atlantic City, elevated on concrete foundations to protect it from corrosive action of salt water. 4 ill., 1,000 words. Journal of the American Water Works Association, December. 50 cts.

Protection of Riveted Steel Pipe. Describes the method of coating riveted steel water pipe used in California; com-

pires various coatings and also compares cast iron and steel pipe. By Leonard Metcalf. 2,600 words. Engineering and Contracting, December 30. 10 cts.

Laying Twelve Miles of Concrete Pipe. Description of manufacture of pipe and methods of laying. 2,000 words. Cement and Engineering News, December. 10 cts.

Narrows Flexible Joint Submarine Siphon. Unusual floating plant and 60-ton steel cradle; difficult dredging in deep water, and special joint are features of 36-inch line across New York Bay. By John P. Hogan. 5 ill., 4,500 words. Engineering Record, December 19. 10 cts.

Inertia Effects in Pipe Lines. Consideration of the elasticity of both water and pipe wall with formulas. By S. L. Berry. 2,000 words. Canadian Engineer, December 10. 15 cts.

**Brass** in Water Works Construction. Discussion of cause of and remedies for cracks in bolts and plates. 1 ill., 3,000 words. Municipal Journal, December 24. 10 cts.

**Pumps**, Economical Duty of. Analyses of costs of pumps and pumping engines, and comparisons between special tests and every-day station duty. By Frank H. Carter. 4 ill., 2,200 words. Engineering Record, December 5. 10 cts.

#### STREET LIGHTING AND POWER.

**Lighting** Residence Streets in Helena. Lamp standards, lamps and underground wiring described; costs given. By Chas. Helmick. 1 ill., 1,500 words. Municipal Journal, December 24. 10 cts.

Street Lighting Rates and Cost Factors. Touches on quality of lighting, type and quality of light, lighting rates and describes Chicago's street lighting system. By Ray Palmer, Comr. Gas & Electricity, Chicago. 3,000 words. Water & Gas Review, December. 20 cts.

Street Lighting Rates and Cost Factors. From an address by Ray Palmer. 3,000 words. The American City, December. 25 cts.

Contracts for Street Lighting. Discussion of contracts in general with particular reference to Watertown, Wis., contract. 2,000 words. American Gas Light Journal, January 4. 10 cts.

Street Lighting Fixtures. Some new forms of fixtures are illustrated and described. 4 ill., 500 words. Municipal Journal, January. 25 cts.

Securing and Retaining Residence Lighting. From paper by W. A. Morris, Manager, Wilmington Gas Company. 17 ill., 10,000 words. The Gas Age, January 20. 20 cts.

Detroit's Municipal Lighting Plant. History of the plant which was installed in 1895; gives general methods of operation and detailed cost data. 2 ill., 4,000 words. Power, December 15. 5 cts.

**Storage Batteries** for Electric Plants. Advantages such as the carrying of peak loads and furnishing of day service claimed. By J. S. Springer. 2 ill., 3,000 words. Municipal Journal, December 24. 10 cts.

**Electrical Equipment** of the Panama-Pacific Exposition. Various features of the exterior and interior electric distribution system; extensive use of wooden manholes and conduit; decorative and general illumination. 20 ill., 3,000 words. Electrical World, December 26. 10 cts.

**Gas Rates**. Specific examples of the benefits from scientific rates suggests a rate based on use, not on quantity used. By H. L. Coleman. 4,000 words. American Gas Light Journal, December 7. 10 cts.

. . . Gas Testing Ordinances. Second of a series of articles. This deals with calorimetry or the measurement of the heat value of the gas. By Jacques Abady. 1 ill., 6,000 words. American Gas Light Journal, December 14. 10 cts.

#### FIRE AND POLICE.

**Fire Departments**, Public. Organization here and abroad; salaries; apparatus and equipment; hose and fire stations. By George W. Booth, Chief Engineer, National Board of Fire Underwriters. 6,000 words. Fireman's Herald, January 2. 5 cts.

Dayton Fire Department. Report of National Board of Fire Underwriters. 1,500 words. Fire and Water Engineering, December 23. 10 cts.

The Call Men's Case. Presentation of the service rendered by Call men and the difficulties under which they labor. 800 words. Fireman's Herald, December 26. 5 cts.

**Fire Boats**, Protection of Water Front by. Extract of paper by Thomas A. Clancy, Chief, Milwaukee F. D. 4 ill., 2,000 words. The American City, December. 25 cts.

**Fire Apparatus** at Present in Service in the United States and Canada. (Tabulated). Fire and Water Engineering, December 9. 10 cts.

Motor Driven Fire Apparatus. Twelfth of a series of articles by Victor W. Page. 5 ill., 3,000 words. Fire & Water Engineering, December 9. 10 cts.

Automobile Fire Stations. Design of station for motorized fire departments. By Arthur S. Aungst, Chief, East Liverpool, Ohio. 2 ill., 3,500 words. The Fire Engineer, November. 10 cts.

The Gasoline Pumping Engine. Utility and economy of combination pumps and hose cart; service given by various makes of engines. By Edward F. Dahl. 1,200 words. Fireman's Herald, December 26. 5 cts.

**Prevention** and Sprinklers, Fire. By John Kenlon, Chief, New York Fire Department. 2,500 words. Fire and Water Engineering, December 23. 10 cts.

Fire Inspections in Boston. Results of system instituted about six months ago. Extracted from report by John Grady, commissioner of fire, Boston, Mass. 700 words. Municipal Journal, December 17. 10 cts.

Fire Protection and Fire Prevention. By John C. McDonnell. 2,500 words. Fire and Water Engineering, November 25. 10 cts.

**Hose**, Care of Fire. 700 words. Municipal Journal, December 17. 10 cts.

**Police** Headquarters, Building and Equipment of Calgary's New. 1 ill., 1,000 words. Contract Record, December 23. 10 cts.

**Signal Boxes**, Safe Grounding for Fire and Police. By A. C. Farrand, city electrician, Ventnor City, N. J. 1,700 words. Fire and Water Engineering, November 25. 10 cts.

**Sprinkler Systems**, Economics of Automatic. By William H. Black. 3,000 words. The Fire Engineer, November 10 cts.

#### STREET CLEANING AND REFUSE DISPOSAL.

**Street Cleaning** Statistics. Gathered from 150 cities; gives kind and areas of pavements cleaned, methods of cleaning employed and amount and disposal of sweepings. 12 pages. Municipal Journal, December 10. 25 cts.

Total Annual Cost of Street Cleaning. Reports from over 100 cities presented in tabular form. 2 pp. Municipal Journal, December 17. 10 cts.

Street Cleaning Records. Editorial. 1,100 words. Municipal Journal, December 21. 10 cts.

Milwaukee Bureau of Street Sanitation. Duties include street cleaning, collection and disposal of refuse and catch basin cleaning; force employed and costs. 3,000 words. Municipal Journal, December 17. 10 cts.

**Snow Removal** Principles. Summary of papers and discussions at Philadelphia conference on snow removal. 3 ill., 3,000 words. Municipal Journal, December 10. 25 cts.

New York's Snow Removal Plans. Snow fighting to start at the beginning of the storm; snow to be shovelled into sewers. 4 ill., 3,000 words. Municipal Journal, December 10. 25 cts.

**Refuse Destructor** in Savannah, Ga. Description of the special features of design and operation with results of tests made in August. By E. R. Conant, City Engineer. 5 ill., 3,000 words. Municipal Engineering, December. 25 cts.

Modern Practice in Refuse Disposal. An outline of methods adopted in England and France; systems of disposal; sorting the refuse. By E. R. Matthews, Prof. of Municipal Engineering, University of London. 1,750 words. Contract Record, December 23. 10 cts.

Emergency Garbage Disposal in Chicago. Acid treatment in five vats and burial in clay holes between layers of ashes. By Geo. D. Young, Commissioner of Health. 4 ill., 2,500 words. Engineering Record, December 19. 10 cts.

Recent Refuse Disposal Practice. Covers progress during the past eight years in reduction and destructor plants. 4,500 words. Municipal Journal, December 10. 25 cts.

Incinerators for Small Towns. Descriptions by city engineers of two recently built for towns of 10,000 population or less. 2 ill., 1,000 words. Municipal Journal, December 10. 25 cts.

(Continued on page 85.)

## NEWS OF THE SOCIETIES

### Calendar of Meetings.

Jan. 20-22.

**OHIO ENGINEERING SOCIETY.**—Meeting, Brown Hall, Ohio State University, Columbus, O. Secretary and treasurer, John Laylin.

Jan. 20-23.

**INDIANA ENGINEERING SOCIETY.**—Annual meeting, Hotel Severin, Indianapolis, Ind. Secretary, Charles Grossman.

Feb. 19-20.

**LEAGUE OF WASHINGTON MUNICIPALITIES.**—Fifth Annual Convention, Olympia, Wash. Secretary-Treasurer, Dr. Herman D. Brauer, Univ. of Washington, Seattle, Wash. Jan. 27-29.

**ILLINOIS SOCIETY OF ENGINEERS AND SURVEYORS.**—Thirtyith annual meeting, exhibit and dinner, Leland Hotel, Springfield, Ill. Secretary, E. E. R. Tratman, Wheaton, Ill.

Jan. 26-28.

**WESTERN SOCIETY OF ELECTRICAL INSPECTORS.**—Annual meeting, Minneapolis, Minn. Secretary, W. S. Boyd, 76 W. Monroe St., Chicago, Ill.

Feb. 9-12.

**AMERICAN CONCRETE INSTITUTE.**—Convention, Chicago, Ill. Secretary, E. E. Krauss, Harrison Bldg., Philadelphia, Pa.

Feb. 10-17, 1915.

**EIGHTH CHICAGO CEMENT SHOW.**—Colliseum, Chicago, Ill. Cement Products Exhibition Co., J. P. Beck, General Manager, 208 S. La Salle Street, Chicago, Ill.

Feb. 15-20.

**MINNESOTA SURVEYORS AND ENGINEERS SOCIETY.**—Annual meeting, St. Paul, Minn. Secretary, George H. Herrold, City Hall, St. Paul.

Feb. 19-20.

**TECHNOLOGY CLUBS ASSOCIATED.**—Third annual convention, Pittsburgh. Secretary, H. A. Rapelye.

March 11.

**VERMONT SOCIETY OF ENGINEERS.**—Meeting at Burlington, Vt. Secretary, George A. Reed, Barre, Vt.

May 10-14, 1915.

**AMERICAN WATERWORKS ASSOCIATION.**—Annual Convention Cincinnati, O. Secretary, J. M. Diven, 47 State street, Troy, N. Y.

June 14-16, 1915.

**SOUTHWESTERN WATERWORKS ASSOCIATION.**—Annual Convention, Galveston, Tex. Secretary, F. L. Fulkerson, Waco, Tex. Sept. 20-25, 1915.

**INTERNATIONAL ENGINEERING CONGRESS.**—Am. Soc. C. E., Am. Inst. Min. E., Am. Soc. Mech. E., Am. Inst. E. E. and Soc. N. A. & M. E., San Francisco, Cal. Secretary, W. A. Catell, Foxcroft Building, San Francisco, Cal.

### American Highway Association.

United States Treasurer John Burke is taking an active part in the good roads movement and has accepted the office of Treasurer of the American Highway Association, to succeed the late Lee McClung, who from the time of the formation of the association until his death, a few weeks ago, was an active worker for the betterment of road conditions, and found time from his duties as Treasurer of the United States to give the closest attention to road problems. Mr. Burke in taking up his duties emphasized the fact that many of the most serious questions in connection with the attainment of better roads were those connected with taxation and finances. An annual outlay of \$225,000,000, such as we now have, calls for the utmost care and thoroughness to prevent waste, misappropriation and injudicious expenditures. "In the matter of bond issues," says Mr. Burke, "I understand that the practice has been very general of issuing bonds for very long terms and expending the proceeds on roads which have a comparatively short life, so that the debt outlives the utility. I understand also that there

is considerable laxity in the matter of retirement of bonds. In a great many sections of the country little or no attention is paid to the relative merits of the serial bond and the fixed term bonds which are retired by a sinking fund. As a matter of fact, it can be mathematically shown that in many cases a serial bond will result in a marked saving to the public." On account of the fact that many legislatures will be in session during the winter the association will direct its efforts toward securing revision of road laws and the adoption of such new legislation as will tend to promote simplicity and efficiency, and at the same time safeguard the handling of public funds. Mr. Burke has as his colleagues in the management of the American Highway Association, Fairfax Harrison, President of the Southern Railway, President; Logan Waller Page, Director of the U. S. Office of Public Roads, Vice-President; and James S. Harlan, Chairman of the Interstate Commerce Commission, Chairman of the Board of Directors.

### League of Washington Municipalities.

The fifth annual convention of the League of Washington Municipalities is to be held at the Hotel Mitchell, Olympia, Wash., January 25-27, 1915. General sessions will be held in the assembly hall of the Olympic Free Public Library. Committee meetings and section conferences will be held at the headquarters of the Olympia Chamber of Commerce. The usual convention rate of one and one-third railroad fare will be allowed on the certificate plan from all points in Washington and from Portland, Ore. The program follows:

**Monday, January 25th**—Afternoon Session, 2 to 5 P. M.—Call to order by the president. Address of welcome—Governor Ernest Lister. Welcome to Olympia—Mayor George A. Mottman, Olympia. Response—President Howard A. Hanson, Seattle. Report of secretary-treasurer—Dr. Herman A. Brauer, University of Washington, Seattle. Appointment of committees on credentials and auditing. Introduction of resolutions.

Reports and Announcements from Sections: City engineers—D. W. Morris, assistant city engineer, Seattle. City attorneys—James E. Bradford, corporation counsel, Seattle. Treasurers, controllers and clerks—W. H. L. Ford, city treasurer, Everett.

Reports and Announcements from Standing Committees: Election committee—Dan F. North, city attorney, Bellingham. Eminent domain—James E. Bradford, corporation counsel, Seattle. Home rule—Mayor Hiram C. Gill, Seattle. Public health—Dr. J. E. Crichton, Seattle. Third-class cities—C. L. Holcomb, city attorney, Kennewick. Fourth-class cities—Senator Arthur McGuire, city attorney, Waterville.

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**Evening Session, 8 P. M.**—The Philadelphia convention—E. D. O'Brien, assistant superintendent public utilities, Seattle. Home rule for cities—Dr. J. Allen Smith, professor of political science, University of Washington, Seattle. Discussion opened by Mayor Hiram C. Gill, Seattle. Proposed constitutional amendments—James E. Bradford, corporation counsel, Seattle.

**Tuesday, January 26th**—Morning Session, 9:30 to 12 M.—Committee and Section Conferences: Elections—Chairman, Dan F. North, city attorney, Bellingham. City attorneys—Chairman, James E. Bradford, corporation counsel, Seattle. Treasurers, controllers and clerks—Chairman, W. H. L. Ford, city treasurer, Everett.

**Afternoon Session, 2 to 3 P. M.**—Municipal budgets and their disposition—James F. Leghorn, Bureau of Inspection and Supervision of Public Offices, Olympia. Discussion. Introduction of resolutions.

**Committee and Section Conferences, 3 to 5 P. M.**—City engineers—Chairman, D. W. Morris, assistant city engineer, Seattle. Public health—Chairman, Dr. J. E. Crichton, Seattle. Eminent domain—Chairman, James E. Bradford, corporation counsel, Seattle. Third-class cities—Chairman, C. L. Holcomb, city attorney, Kennewick. Fourth-class cities—Chairman, Senator Arthur McGuire, city attorney, Waterville.

**Evening Session, 8 P. M.**—Revision of election laws—Hon. I. M. Howell, secretary of state, Olympia. Proposed electoral code—Dan F. North, city attorney, Bellingham. Discussion opened by Hon. Leo O. Meigs, city attorney, North Yakima, former speaker of the house of representatives.

**Wednesday, January 27th**—Morning Session, 9:30 to 12 M.—Committee Conferences: Eminent domain—Chairman, James E. Bradford, corporation counsel, Seattle. Third-class cities—Chairman, C. L. Holcomb, city attorney, Kennewick. Fourth-class cities—Chairman, Senator Arthur McGuire, city attorney, Waterville.

**Afternoon Session, 2 to 5 P. M.**—Visiting nurses—Miss Donaldena McDonald, public health department, Tacoma. Proposed legislation for third and fourth-class cities. Reports from section conferences and committee meetings. Adoption of resolutions.

**Evening Session, 8 P. M.**—Purification of water in the household—William Frank Allison, professor of municipal engineering, University of Washington. The proposed act for the control of water supplies and sewage disposal—Dr. Eugene R. Kelly, state commissioner of public health, Seattle. Oregon water code—John H. Lewis, state engineer, Salem, Oregon. Proposed water code for Washington—Judge Carroll B. Graves, Seattle.

The officers are: President, Howard A. Hanson, Asst. Corp. Counsel, Seattle; Vice-President, Mayor W. J. Hind-

ley, Spokane; Secretary-Treasurer, Dr. Herman A. Brauer, University of Washington.

#### Indiana Engineering Society.

The annual meeting of the Indiana Engineering Society will be held Jan. 21-23 at the Hotel Severin, Indianapolis, Ind. Among the interesting papers of the Thursday session will be one on Compensation and Appointment for City Engineers, by A. P. Melton. The committee on waterworks, which is composed of Charles Brossman, Theo. Leisen and J. W. Moore, will deliver their report. The annual banquet of the society will be given Thursday evening.

Reports of the committees on stream pollution, sewerage and drainage will be heard Friday forenoon, and papers on general engineering topics will be heard in both the forenoon and afternoon sessions. At the evening session the committee on roads and pavements will report and papers will be read as follows: Design of Concrete Bridges, by W. J. Titus, National Bridge Co.; Results of a Traffic Census at Lafayette, Ind., by G. E. Martin; The Indiana Road Problem, by C. A. Kenyon. Another paper on road construction—Kinks in Concrete Road Building, by C. D. Franks—will be read at the Saturday session.

The officers are: Albert Smith, president; James B. Short, vice-president; Charles Brossman, secretary. The board of trustees consists of H. W. Klausman, D. V. Moore, H. O. Garman, Donald Heaton and L. W. Wallace. The following are members of committees:

Drainage—J. S. Spiker, Vincennes; Guy F. Stinchfield, Valparaiso, Ind. Water Works—Chas. Brossman, Indianapolis; Theo. Leisen, Detroit, Mich.; J. W. Moore, Indianapolis. Sewerage—Chas. Brossman, Indianapolis; J. C. Diggs, Indianapolis. Roads and Pavements—A. P. Melton, Gary; B. J. T. Jeup, Indianapolis; C. D. Franks, Chicago, Ill.; P. E. Latchem, Huntington. Stream Pollution—R. L. Sackett, Lafayette; H. E. Jordan, Indianapolis; U. S. Hanna, Bloomington.

#### Illinois Society of Engineers and Surveyors.

The thirtieth annual meeting will be held at the Leland Hotel, Springfield, Illinois, January 27 to 29. A room will be provided for exhibits of drawings and photographs of engineering work, samples of construction materials, surveying instruments, etc. The program has not yet been announced, but it is proposed to include the subject of "Surveying" at the morning session of January 28th.

A partial list of papers and reports is as follows: Surveys of Public Lands; Land and City Surveying; Paving for Streets Having Car Tracks, by Geo. Bengel; Paving Practice at Springfield; Burned Shale for Paving in Parks; A Street Having Only One Gutter; Economics of Brick and Concrete

for Roads, by H. E. Bilger; Concrete Road at Marquette Hill, by B. H. Piepmeyer; Brick Paving for Rural Highways, by R. L. Bell; Common Defects in Concrete Road Construction, by A. H. Hunter; Kinks in Concrete Road Construction, by C. M. Powell; Concrete Mixing and Distributing in Street and Road Work; The Water Supply and Sewerage of Springfield; Sewerage and Sewage Disposal; The Illinois Rivers and Lakes Commission, by L. K. Sherman; Bell-End Pipe for Land Drainage; South Quincy Levee District, by E. T. Perkins; Estimating Curves for Highway Bridges, by G. F. Burch; Bridges and Masonry; The Testing Laboratory at Lewis Institute, by D. A. Abrams; The Illinois Civil Service Commission, by W. R. Robinson; Assisting the Young Graduate Engineer, by J. E. Melluish.

An automobile trip is planned, with visits to some of the following points: City pavements and paved country roads, Springfield Water Works pumping station, The Sangamo Meter Works, The Springfield Paving Brick Co., The Baker Mfg. Co., The Springfield Boiler Works, The Zinc Smelter and The Illinois Match Factory. The annual dinner will be special feature of the meeting. J. J. Harman, of Peoria, Ill., is president. E. E. R. Tratman, of Wheaton, Ill., is secretary.

#### Engineering Society of Western Pennsylvania.

At the annual meeting of the structural section of the Engineers' Society of Western Pennsylvania, in the Oliver Building, Pittsburg, Pa., Jan. 5, these officers were elected: Paul Woefel, president; H. A. Thayer, vice-president; Herman Laub, W. A. Nichols and A. C. Donaldson, directors. O. E. Hovey, assistant chief engineer of the American Bridge Company, read a paper on "Emergency Dams of the Panama Canal."

## BOOK REVIEW

**AMERICAN SEWERAGE PRACTICE.** Vol. I.—By Leonard Metcalf and Harrison P. Eddy. McGraw-Hill Book Co., New York. 721 pp. \$5.

This is the first of three volumes, the second of which is in press and the third under way, which have been prepared by Metcalf and Eddy, consulting engineers of Boston, and which bid fair to be the most notable contribution to the literature of American sewerage practice which has yet appeared. The first volume, of more than 700 pages, is devoted entirely to the designing of sewers; the second volume will deal with the construction of sewers, while the disposal of sewage will form the subject matter of volume three. The combined experience of Messrs. Metcalf and Eddy and their partners and office staff, all of which co-operated in the preparation of the

book, is probably as great as, if not greater, than that of any other engineers in this country in the designing and construction of sewers; and the authors therefore have not only the rapidly increasing volume of literature on the subject from which to draw, but also their own wide experience.

This volume is really encyclopedic in its nature, and is apparently intended for those who are making a thorough study of the subject rather than for the young engineer or the occasional designer of sewerage systems. Beginning first with a thorough discussion of the general arrangement of sewerage systems, the authors devote forty-four pages to the hydraulics of sewers, discussing at considerable length all of the better known formulas, coefficients and methods which have been employed for computing sewer discharge. Velocities and grades and their effect upon deposits and erosion are then discussed, followed by a chapter of twenty-three pages describing various methods and appliances for the measurement of water flowing in sewers.

In dealing with the quantity of sewage to be provided for, fifty-seven pages are devoted to discussing population and other factors entering into the problem of quantity of house sewage; twenty-eight pages concerning appliances for measuring precipitation; twenty-eight pages discussing the various formulas for estimating storm water flow, and thirty-eight pages for describing the rational method of designing storm water sewers. Following this, a chapter of twenty-seven pages is devoted to describing float gauges and other methods of measuring the flow in storm water sewers.

The remaining chapters are devoted to a study of sewer pipe and the pressures which come upon it in trenches and its strength, and the various sections which have been used for concrete or other masonry sewers, one chapter of forty-two pages being devoted to a mathematical discussion of masonry arches. Three chapters are devoted to a discussion of the purposes and designs of inlets, manholes, regulators and other appurtenances of sewerage systems, and the last chapter of seventy-five pages is devoted to sewage pumps and pumping stations, which subject, like all the others, is considered at great length from the theoretical point of view.

Not only is each of these various subjects discussed most thoroughly, but quotations from various authorities, both in the form of articles which have appeared in print and of opinions obtained by correspondence, form a considerable part of the text. Apparently an effort, and a very successful one, has been made to describe practically every method and appliance dealing with sewerage systems which has been used in this country with any success, even to the extent of quoting complete descriptions of installations from the

*Continued on page 85*

# NEW APPLIANCES

**THE HOUGHTON DRYER.**  
Multiple Tube, Indirect Heat, Rotary Design.

The Houghton Indirect Heat Rotary Dryer is a mechanically-operated circular, multiple tube dryer, consisting essentially of five or more tubes set in steel supporting rings rotating on a common axis. The tubes are separated from each other to allow the fuel gases to circulate around the surface of each tube, the dryer being placed in a bricked-in flue, so that no part of the apparatus is exposed to the atmosphere. This construction gives a great deal more heating surface than a single tube dryer. The heat being taken through a central tube keeps the drying material entirely free from direct contact with fuel gases. This dryer is made in two classes, Class A for solid material, and Class B for liquid and semi-liquid material.

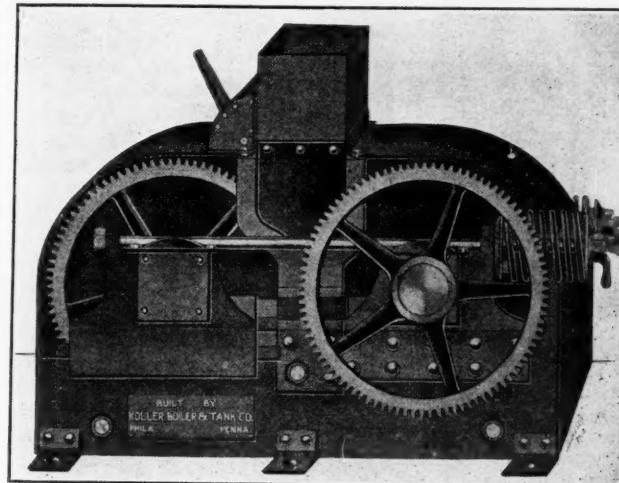
The drying chamber consists of the tubes, of any required diameter or length, opening into a cone-shaped steel receiving chamber, in which the material to be dried is automatically fed, and as the dryer rotates each tube is filled. The dryer is set at an angle of about seven degrees, so that the rotation of the tubes constantly changes the position of the material and gradually works it down to the discharging chamber. Here a means is provided for controlling the quantity of material to be discharged according to the amount of moisture in it, and the dried matter is collected in this chamber ready for the conveyor. As the dryer rotates in the flue it acts as a fan to distribute the heat equally throughout the combustion chamber, and retards the flow of gases so that, it is claimed, they may be exhausted at a temperature of 200 degrees or less. The flue has a series of cast iron cover plates to permit of easy access to the tubes for cleaning and repairs. When these plates are removed the entire dryer may be lifted out and new tubes

installed at very slight expense. The flue has also a number of cleanout doors. The dryer is mounted on heavy supporting trucks on which it rotates, and the downward thrust is taken up by a steel shaft set in ball bearings.

The Class B dryers are of the same general construction as the others, but are especially designed for drying such materials as sludge, other tankage, wet garbage, etc. In this the drying chamber is hermetically sealed at both feed and discharge ends. At the feed end there is a pipe to carry off the vapors and gases arising from the drying material to either a disinfecting and deodorizing tank or else to carry these back to the furnace. This central pipe can be used as a feed pipe for liquids. Semi-liquids are fed into the dryer by opening the end of the feed chamber. Plans are also provided for discharging chemicals directly into the drying chamber, where complete deodorizing of the dried material is required. At the discharge end is placed a double door completely closing the entire set of tubes, which can easily and quickly be opened for discharging the dried material or getting at the end of the chamber. A simple locking device consists of a five-armed ring pressed up against the door. Encircling the end of each tube is an air pocket, which provides an air or water packing.

The makers of these dryers, the Koller Boiler & Tank Co., 421 Chestnut St., Philadelphia, Pa., and 114 Liberty St., New York City, N. Y., also make crushing rolls. The principal feature is that the journal is not pivoted. The rolls have a simple com-

pensating movement moving the two boxes equally on one side of the machine, bringing equal pressure to bear on both springs, so that the rolls open an exact distance the entire length,



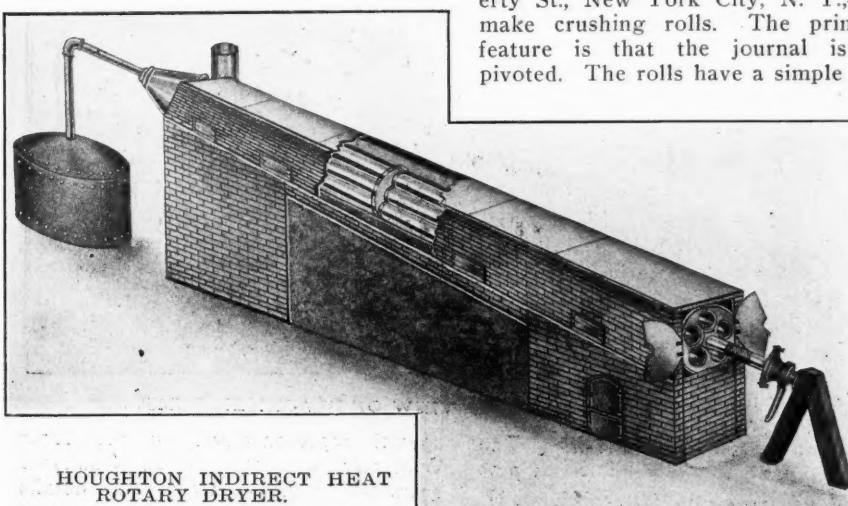
CRUSHING ROLL.

bringing the shafts parallel to each other. This eliminates cramping and heating and reduces the amount of oil used. The roll is made of steel plate throughout. It is made in rolls all sizes from 6 inches to 6 feet. These may be obtained with gear drive or belt drive. The illustrations show a Class B dryer and one of the crushing rolls.

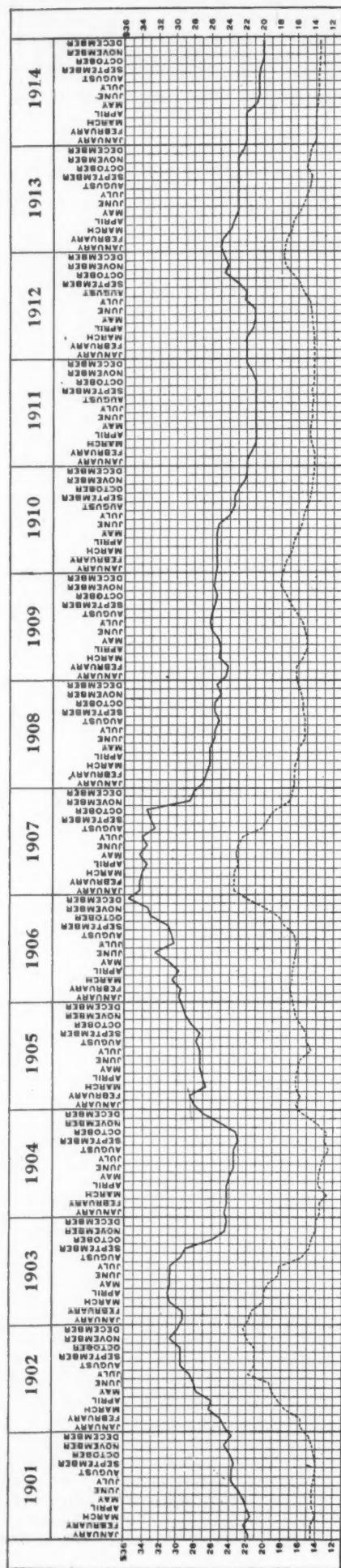
**THE BLACKMER ROTARY PUMP**  
For Pumping Heavy Liquids.

The Blackmer Rotary Pump differs in construction from the centrifugal or rotary pumps and is calculated to serve not only in the field of these, but also for pumping for which the steam piston pump is commonly used. The pump is positive-acting and close-fitted, and is made in solid iron, solid bronze, iron with iron lining, iron with bronze lining, and bronze with bronze lining. They may be obtained connected on self-contained bases to electric motors, gasoline or steam engines. The Blackmer pumps are made in nine sizes, varying from 12 gallons per minute capacity to 500.

The Blackmer pumps have few parts and no springs or adjustments. As the buckets hang in the piston and swing out freely, they take up the wear automatically. The piston or motor is securely fastened to the shaft and revolves with it, causing the buckets to throw out against the cylinder by centrifugal force and gravity. This causes the air to be exhausted from the extension or water chamber, allowing the atmospheric pressure to force the liquid into the pump, filling the extension chamber and forcing it out of the



HOUGHTON INDIRECT HEAT ROTARY DRYER.



discharge. This liquid cannot carry by the discharge part—the only material carrying by being that which fills the recesses on the piston and acts as a fluid packing, keeping the pump suction tight at all times. In this type of pump it is claimed that the friction is reduced to a minimum, thus permitting a large amount of fluid to be handled with a minimum amount of power. With the pump suction lift, the pump is calculated not to need priming.

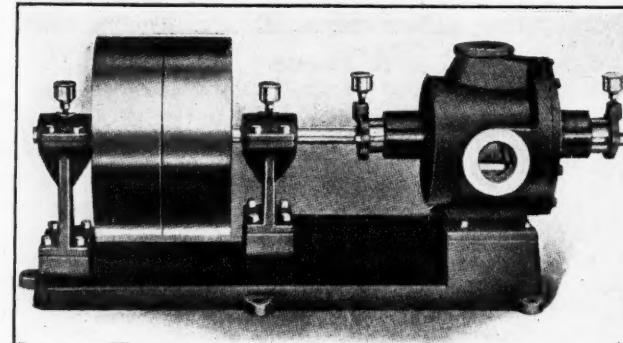
The Blackmer pumps are made to handle water, oil, gasoline, sewage, road oil, tarvia and similar materials. These pumps are made by the Blackmer Rotary Pump, Power & Mfg. Co., Petoskey, Mich. The illustrations show a No. 6 Special Blackmer pump, all solid, having a capacity of 100 gallons per minute at a pressure up to 40 pounds; and an interior view of the pump showing cylinder, piston and buckets.

## INDUSTRIAL NEWS

**Cast Iron Pipe.**—Chicago.—In addition to 1,000 tons to be awarded at Cincinnati there are now nearly 4,000 tons of municipal lettings reported. These include 250 tons at Ferdinand, Ind.; 500 tons at New Boston, O.; 300 tons at Carroll, Ia.; 1,500 tons at Kansas City, Mo., and 1,200 tons at St. Paul, Minn. Quotations: 4-inch, \$25.50; 6 to 12-inch, \$23.50; 16-inch and up, \$23. Birmingham.—Output has increased and outlook appears satisfactory. While quotations have not been upheld the shops have made a fair start for the new year. Quotations: 4-inch, \$20; 6-inch and up, \$18. New York—No municipal lettings of importance in sight at present. Low bidder on Boston contract was R. D. Wood & Co., naming \$21.24 on 4-inch, \$19.74 on 6 to 10-inch and \$19.24 on 12 to 30-inch. Low bidder for Medford, Mass., letting was Standard Cast Iron Pipe & Foundry Co., naming \$21.21 on 6 and

8-inch, and \$20.70 on 10 and 12-inch. The same company was low bidder on pipe bought by Northampton, Mass. Quotations: 6-inch and up, \$20 to \$20.50.

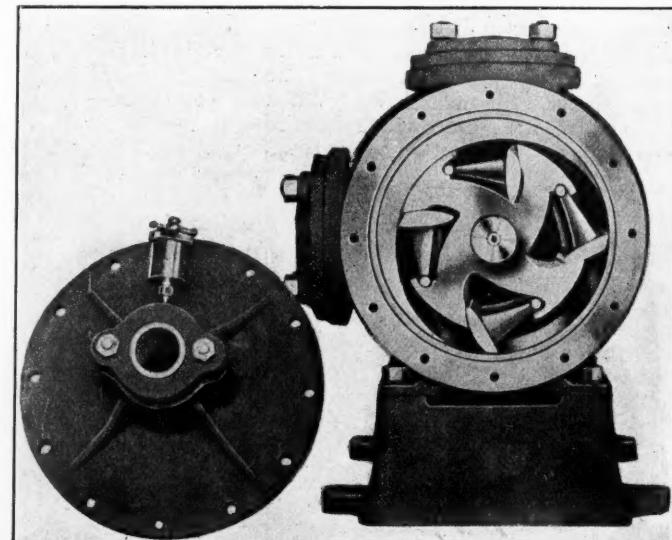
**Lead.**—Quotations: New York, \$3.70; St. Louis, \$3.50.  
**Prices of Cast Iron Pipe, 1901-1914.**



BLACKMER ROTARY PUMP.

—The accompanying curve, reproduced from The Iron Age Annual Review Number, shows the fluctuations of prices for the last fourteen years on 6-inch cast iron water pipe f.o.b. New York City, in carload lots per ton of 2,000 lbs. The prices for the first nine years were furnished by Daniel Runkle, of the Warren Foundry & Machine Co., New York, and for the remaining period were averaged from weekly quotations in The Iron Age. The dotted curve underneath represents the course of prices on gray forge pig iron at Philadelphia.

**The Goodyear Tire & Rubber Company,** Akron, O., has taken over the sale of the products of the Motz Tire & Rubber Company: "Motz High Efficiency Cushion Tires," for electrics; "Motz High Efficiency Commercial Cushion Tires," for gasoline and electric commercial cars, and "Motz Cushion Side Flange Truck Tires." The transfer of sales will formally take place February 1st. On and after that date Goodyear will make all sales and adjustments. In the meantime



INTERIOR VIEW OF BLACKMER PUMP.

special representatives of the Motz Company will call at all Goodyear branches, to make sure that all details are handled without confusion and that

the trade is taken care of. By the new arrangement it is promised that users of Motz Tires will receive much better service than ever before, because of the facilities provided by Goodyear branches in all the principal cities of the country. Hitherto Motz Tires have been handled by distributors in various cities. Hereafter the sales methods and policies applying to them will be the same as apply to other products in the regular Goodyear line. For the present, the sale of Motz Tires will be handled as a part of the work of the Goodyear Motor Truck Tire Department, under the direction of C. W. Martin, Jr., manager of that department. Motz Tires have made a well-known place for themselves in the automobile field. Their first strength was in electric pleasure car equipment, and in a few years after their introduction they became standard equipment with many makers of electrics. Of late years they have also invaded the commercial vehicle field and are now favorably known in all branches of motordom.

#### BOOK REVIEWS.

(Continued from page 82.)  
Transactions of the American Society of Civil Engineers, and of other societies and from the technical papers. For instance, under the head of pumping plants, the authors have quoted a page of an article by Professor Swain in the Journal of the New England Water Works Association, two-thirds of a page from the Annales des Ponts et Chausses describing a Paris pump-

ing station, two pages from suggestions published by the Snow Pump Works, two-thirds of a page from an article before the American Society of Civil Engineers, by John H. Gregory, describing the Columbus, Ohio, pumping station, one-half page from another article describing the Waltham, Mass., pumping station, together with numerous shorter quotations from other articles describing various details of sewage pumping plants.

In spite of the number of quotations and of plants described, it was of course necessary to select only a few of those available, and in making such selection the authors have generally shown very good judgment. The engineer of limited experience who endeavors to obtain from this work instruction for the designing of a sewerage system would undoubtedly wish that the authors had not imposed so much upon his limited judgment in selecting between alternative formulas, methods, etc.; but, on the other hand, they are undoubtedly to be commended for having suppressed their own views on most of the subjects in presenting fully and without comment those held by the leading engineers and investigators.

As a book of reference from which the student of engineering can learn practically all of the best practices in sewer designing followed in this country, this book stands alone, and must form an important part of the reference library of every engineer who is making a thorough study of the subject.

#### MUNICIPAL INDEX.

(Continued from page 80)

**Cost of Collecting, Hauling, Transferring and Transporting Refuse Materials.** Comparative costs of hauling by motor truck, trolley, barge and steam railway. By Samuel A. Greeley. 2,100 words. Contract Record, December 2. 15 cts.

**TRAFFIC AND TRANSPORTATION.** **Traffic Congestion Problem.** Describes the principles of procedure and enough of the detail to indicate how any particular problem may be attacked. By W. S. Messenger. 7 ills., 2,400 words. Municipal Engineering, January. 25 cts.

The Recent Traffic Census. State highway patrolmen record the number and class of passing vehicles on two specific dates. By Philip Farley. 3,000 words. New York Highway News. December. 10 cts.

**Rapid Transit** Railway Extensions, New York. Twelfth and last of series of articles. This describes concrete plants throughout, and design and construction of the elevated concrete structure at Queens Boulevard. By F. Davis. 6 ills., 2,500 words. Engineering News, December 31. 15 cts.

#### BRIDGES.

**Bridges on Columbia Highway.** By K. P. Billner. 9 ills., 1,600 words. Engineering News, December 10. 15 cts.

Design and Construction with Detailed Costs of the Richelieu River Bridge, Quebec. Second of two articles on the replacement under traffic of the 970-foot bridge. 8,500 words. Engineering and Contracting, December 23. 10 cts.

Reinforced Concrete Bridge with Cantilever Abutments. 3 ills., 1,200 words. Engineering Record, December 5. 10 cts.

Steel Bridge Standards of the Iowa Highway Commission. Types of structures adopted; provision for expansion. By E. F. Kelly. 5 ills., 1,800 words. Engineering Record, December 12. 10 cts.

Progress on the New Quebec Bridge. Notes on 1914 work on the superstructure of the bridge. Details respecting allowances for deformation of large

members when subjected to full load. By H. P. Borden. 3 ills., 1,200 words. Canadian Engineer, December 31. 15 cts.

Raising the Standard of Highway Bridge Design. Description of some of the more artistically designed highway bridges and a short history of the development of concrete bridges. By Geo. D. Steele. Better Roads and Streets, December. 15 cts. 4 ills., 4,000 words.

Reinforced Concrete Bridges. By Daniel R. Luten, consulting engineer. 2,500 words. Cement and Engineering News, December. 10 cts.

Highway Bridge Progress and Problems Discussed. Covers life of timber bridges; types of concrete and steel bridges and their advantages. 11 ills., 2,500 words. Pacific Builder and Engineer, December 19. 15 cts.

The New Bascule Bridge which Connects the Two Sault Ste Maries. 3 ills., 750 words. Contract Record, January 6. 10 cts.

Reinforced Concrete Highway Arch for Grade Separation. Arch with span of 76½ ft, is loaded at the crown only. 3 ills., 750 words. Engineering Record, December 26. 10 cts.

A Discussion of the Administrative and Design Features of Highway Bridge and Culvert Work. By A. Marston. 3,000 words. Engineering and Contracting, December 23. 10 cts.

**Viaduct** at St. Louis, Chief Features in Building Long Concrete. Two types of hammers were used in driving concrete piles; experiences with each type; difficulties in wrecking old bridge on same site; thirty-five railroad tracks had to be kept open. By P. A. Richardson. 3 ills., 2,200 words. Engineering Record, December 26. 10 cts.

Rosedale Section, Bloor Street Viaduct. Section portion of the \$2,500,000 street extension; general features of design. 4 ills., 1,500 words. Canadian Engineer, December 17. 15 cts.

Methods and Costs in Constructing the 450-foot East Fourth Street Viaduct at Fort Worth, Texas. By E. W. Robinson. 11 ills., 10,000 words. Concrete-Cement Age, December. 15 cents.

**MISCELLANEOUS.**

**Legislation** and the Engineer. Dis-

#### PERSONALS

Fitzgerald, R. L., has been appointed business manager of the village of Winetka, Ill. He was formerly connected with Messrs. Sloan, Huddle, Fenstel & Freeman, consulting engineers of Madison, Wis.

The following appointments have been made:

Plainfield, N. J.—Walter Chandler, fire chief; C. M. Dolliver, borough clerk; F. W. Hand, recorder; Julius Stahl, president of the council.

Rome, N. Y.—City attorney, Albert J. O'Connor; commissioner of public works, Frederick J. Hager; commissioner of charities, Eugene A. Adams; civil service commission, Thomas McLaughlin, John H. Comstock, David Karlen; city planning commissioners, Nelson C. Neiss, Lawrence Carey, George R. McDonald.

Rochester, N. Y.—R. Andrew Hamilton, commissioner of public works.

Niagara Falls, N. Y.—T. H. Hogan, city clerk; F. S. Parkhurst, Jr., city engineer; J. J. Conroy, superintendent of streets; G. J. Colpoys and E. J. Cole, board of public works. Health officer, Edward E. Gillick, M. D., one year; members of board of public works, George J. Colpoys, two years; Edwin J. Cole, two years; members of board of water commissioners, George C. Haerle, two years; Henry A. Keller, (Continued on page 24)

cusses licensing and registering engineers. By G. R. G. Conway. 3,900 words. Canadian Engineer, January 7. 15 cts.

Discussion of Some Legal Principles of Interest to Engineers. By William L. Bowman. 5,000 words. Engineering and Contracting, December 16. 10 cts.

**Commission-Manager**, a Year of Government at Lakeland, Fla. A review of the advantages to the city during the past year. By Donald F. McLeod, city manager. 900 words. Engineering News, December 3. 15 cts.

**Machinery**, Highway Construction; How to select for; depreciation, cost of operation, speed and skill required to operate are factors in the selection. By T. R. Agg, Professor of Highway Engineering, Iowa State College. 3,000 words. The Contractor, January 1. 20 cts.

**Educational Field** for Highway Departments. Abstract of paper by Dr. Joseph Hyde Pratt. 1,200 words. Engineering Record, December 5. 10 cts.

**Concrete** for Guard Railings, Durability of. By Howard E. Smith. 2 ills., 1,000 words. New York State Highway News, December. 10 cts.

**Handling Men** on Construction Work to Produce Better Results. The sixth of a series of articles on the relation of contractors and their workmen. The first four dealt with the abuses that have been practiced, while this and the preceding article tell how to remedy these conditions. 3,600 words. The Contractor, December 15. 20 cts.

**City Charter Making**, Evolution In. By William D. Foulke. 7,000 words. National Municipal Review, January. \$1.25.

**Pipe Subways** for the Public Utilities of Chicago. Abstract of report by Lewis A. Dumond. 1,400 words. Engineering Record, December 26. 10 cts.

**Playground** for a Small City. By Warfield Webb. 3 ills., 1,400 words. Municipal Engineering, December. 25 cts.

**Safety Rules** for Operation of Electrical Equipment. Issued by the Bureau of Standards, Washington, D. C. 15 cts. Also Power, December 8. 5 cts.

**Public Market**, The Maisonneuve; Its Construction and Equipment. By R. Percy Sims. 6 ills., 1,800 words. Contract Record, January 6. 10 cts.

# ADVANCE CONTRACT NEWS

**ADVANCED INFORMATION  
BIDS ASKED FOR**
**CONTRACTS AWARDED  
ITEMIZED PRICES**

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

**BIDS ASKED FOR**

STATE	CITY	RECD UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
<b>STREETS AND ROADS.</b>				
Mich., Cadillac		Jan. 23.. 4½ miles concrete road		County Road Commission.
Ind., Muncie		10 a.m., Jan. 23.. Two miles gravel road		Comrs. of Delaware & Henry Counties.
O., Ashtabula		Noon, Jan. 23.. Paving with shale block; cost about \$44,780		M. H. Turner, Dir. P. S.
Minn., Ada		Jan. 25.. Road construction		D. E. Fuller, Aud.
Ind., Danville		10 a.m., Jan. 25.. Road improvements		L. W. Borders, Aud. Henricks Co.
Wash., Everett		Jan. 25.. 30,000 cu. yds. earth fill on Cavalero road		County Commissioners.
Ky., Louisville		Jan. 25.. \$80,000 street work		Board Public Works.
Ind., Indianapolis		Jan. 25.. 500,000 gals. road oil		Board Public Works.
N. J., N. Brunswick		2:30 p.m., Jan. 25.. Concrete paving		Board Chosen Freeholders.
Tex., San Antonio		Jan. 25.. Bitulithic and brick paving		Fred Fries, City Clk.
N. J., Passaic		10:30 a.m., Jan. 25.. 3,740 yds. asphalt macadam; curb and gutter, manholes, etc.		Wm. A. Reid, Dir. Dept. Sts. & Pub. Imp.
N. J., East Orange		8 p.m., Jan. 25.. 8,000 tons broken stone and screenings		L. E. Rowley, City Clk.
Md., Baltimore		Noon, Jan. 25.. 4,800 tons of stone chips		State Roads Commission.
N. Y., Brooklyn		11 a.m., Jan. 27.. Paving with asphalt or granite		L. H. Pounds, Boro. Pres.
O., Troy		noon, Jan. 27.. 13,700 yds. asphaltic concrete, 4,800 lin. ft. curb and gutter		Director of Public Service.
Mich., Flint		Jan. 27.. 110,000 sq. yds. of brick, sheet asphalt, asphalt block, bitulithic and wood block pavements		E. C. Shoecraft, City Engr.
Tex., Greenville		Jan. 27.. Construction of a system of improved highways		Bd. of Permanent Rd. Comrs., Road Dist. 1, Hunt Co.
Ky., Louisville		Jan. 28.. Paving with bituminous concrete, cost \$8,000		Board Public Works.
Ind., New Albany		8 p.m., Jan. 28.. Making and repairing cement sidewalks		Board Public Works.
Cal., Oakland		11 a.m., Jan. 28.. Street improvement		F. M. Smith, City Clerk.
O., Mt. Gilead		11 a.m., Jan. 29.. 77 miles road improvements, two jobs		Comrs. Morrow Co.
La., New Orleans		Noon, Jan. 30.. 27 miles gravel road		W. E. Atkinson, State Hwy. Engr.
N. Y., Brooklyn		11 a.m., Jan. 30.. Grading, curbing and laying sidewalks, also 2,000 tons stone dust		L. H. Pounds, Boro. Pres.
Va., Roanoke		Noon, Jan. 30.. Granolithic sidewalk		P. H. Tucker, City Clerk.
O., Lima		Jan. 30.. 18-foot brick pavement		County Commissioners.
O., Cleveland		Jan. 30.. Road improvements		County Commissioners.
N. J., Milburn		8 p.m., Feb. 1.. Crushed trap rock		W. W. Friberger, Twp. Clerk.
O., Oakwood		noon, Feb. 1.. Paving streets with brick or wood block		George D. Keller, Vil. Clk.
Ind., Fowler		1 p.m., Feb. 1.. Gravel road construction		Warren Waukey, Co. Aud.
Ind., Tipton		10 a.m., Feb. 1.. Gravel road construction		Oscar Van Ness, Co. Aud.
Ind., Valparaiso		2 p.m., Feb. 1.. Gravel road construction		C. A. Blachly, Co. Aud.
N. Y., Bolivar		Feb. 1.. 1½ miles brick paving		Village Clerk.
Ind., Hartford City		2 p.m., Feb. 1.. Grading and improving road		J. L. McGrath, Co. Aud.
Wash., Chehalis		Feb. 1.. Two miles 16-ft. concrete road		County Commissioners
Ind., Greenfield		10 a.m., Feb. 1.. Grading, paving and improving road		L. Wood, Aud. Hancock Co.
Ill., Glencoe		8 p.m., Feb. 2.. Grading and paving		Board Local Improvement.
Ind., Washington		2 p.m., Feb. 2.. Improving highway		Bd. of Comrs. of Daviess Co.
Ind., Petersburg		2 p.m., Feb. 2.. Stone road construction		Comrs. Pike County.
Ind., Rensselaer		2 p.m., Feb. 2.. 21,300 ft. stone road		J. B. Hammond, Co. Aud.
Ind., Brazil		10:30 a.m., Feb. 2.. Stone road		W. O. Grasser, Co. Aud.
Ind., Crawfordsville		10 a.m., Feb. 2.. Concrete, gravel, stone and brick roads		D. D. Engle, Co. Aud.
Ind., Shelbyville		11 a.m., Feb. 3.. 15,631 ft. macadam road		F. W. Fagel, Aud. Shelby Co.
Ind., Muncie		10 a.m., Feb. 3.. Grading and macadamizing road, two jobs		Comrs. Delaware County.
Ind., Indianapolis		10 a.m., Feb. 3.. Gravel road construction		Bd. of Comrs. Delaware Co.
Ore., Bay City		Feb. 4.. Improving streets by grading, paving, curbing and constructing sidewalks, estimated cost \$35,000		City Recorder.
Wash., Chehalis		Feb. 6.. Mile cement road		City Clerk.
Tex., Fort Worth		Feb. 8.. 33 miles of county road		Palo Pinto Co. Com.
Minn., Ivanhoe		1 p.m., Feb. 10.. State road construction		K. A. Hansen, Aud., Lincoln Co.
Ia., Marshalltown		Feb. 15.. Paving		City Clerk.
Wash., Spokane		Feb. 23.. 140,000 yds. asphalt macadam		County Commissioners.
O., Upper Sandusky		Mar. 1.. Fifteen miles water bound macadam		J. Megurat, Aud., Wyandot Co.

**SEWERAGE.**

Ind., Kokomo	10 a.m., Jan. 25.. Garbage disposal	Board Public Works.
Ill., Chicago	11 a.m., Jan. 25.. Sewer pipe and catch-basin covers	L. E. McGann, Comr. P. Wks.
N. J., Passaic	10:30 a.m., Jan. 25.. Repairing or reconstructing 30-in. storm water sewer	Wm. A. Reid, Dir. Dept. Sts.
Pa., Philadelphia	Noon, Jan. 26.. Removing ashes and rubbish from public grounds	M. L. Cook, Dir. Pub. Works.
Mass., New Bedford	4 p.m., Jan. 26.. Castings, sewer pipe, sand, gravel and cement	Wm. Williams, Cons. Engr.
Wash., Puget Sound	10 a.m., Jan. 26.. Terra cotta tile	S. McGowan, Washington, D.C.
Ill., Rockford	11 a.m., Jan. 27.. 17,081 ft. 9-inch sewer pipe; 11,492 ft. 10-inch; 30,000 ft. 12 to 33-inch; 49 manholes; 41 combination manholes; 33 lampholes and 10 flush tanks	President, Bd. Local Imp. City Clerk.
Cal., So. Pasadena	Noon, Jan. 27.. Construction of sewer system	Director Public Service.
O., Cincinnati	noon, Jan. 27.. Main and lateral sewer construction	M. L. Cook, Director.
Pa., Philadelphia	Noon, Jan. 27.. Reconstruction of sewer	Marcus Marks, President.
N. Y., New York	2 p.m., Jan. 28.. Sewer construction	M. E. Connolly, Pres. Queens.
N. Y., Long Island Cty.	11 a.m., Jan. 28.. Sewer construction	Clerk of City Commission.
O., Middletown	noon, Jan. 28.. Removal and disposal of garbage	S. C. Wyse, Engineer & Supt.
S. C., Columbia	10 a.m., Jan. 29.. Ten miles 8 to 15-inch sewer extensions	N. A. Nelson, Co. Aud.
Minn., Stillwater	Jan. 29.. Drainage ditch, cost about \$14,750	M. E. Connolly, Pres. Queens.
N. Y., Long Island Cty.	11 a.m., Jan. 29.. Construction of a destructor plant	P. H. Tucker, City Clk.
Va., Roanoke	Noon, Jan. 30.. Storm drain	

## BIDS ASKED FOR

STATE	CITY	RECD UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Kan., Valley Falls		Feb.	1.. Five miles 6 to 14-inch. vit. sewer pipe and Imhoff tank... City Clerk.	
O., Sandusky		noon, Feb.	1.. Storm and sanitary sewers..... Director Public Service.	
Tex., San Antonio		Feb.	1.. Sanitary and storm water sewers..... Fred Fries, City Clerk.	
O., Oakwood		noon, Feb.	1.. Constructing storm sewers..... Geo. D. Keller, Vil. Clk.	
Mont., Roundup		Feb.	1.. Main sewer and disposal plant..... City Engineer.	
Ind., So. Bend		Feb.	1.. Sewer construction .....	A. P. Perley, Clerk
Tex., Dallas		8 p.m., Feb.	1.. Units of disposal plant .....	R. R. Nelms, Water & S. Com.
S. D., Mitchell		8 p.m., Feb.	1.. Six manholes; 5,063 ft. 10 to 15-inch sewer pipe..... Thos. E. Scott, City Auditor.	
D. C., Washington		10 a.m., Feb.	2.. Cast iron soil pipe and fittings, sewer pipe and plumbing fixtures .....	S. McGowan, Paymaster-General, U. S. N.
Fla., St. Augustine		Feb.	2.. Drainage ditch construction..... Bd. Co. Comrs., St. Johns Co.	
N. J., Newark		2 p.m., Feb.	2.. Southern portion section 18..... Passaic Valley Sewerage Com.	
N. Y., New York		10:30 a.m., Feb.	2.. Constructing sewers .....	President Borough Bronx.
Del., Wilmington		Feb.	2.. 20-in. sewer construction..... State Highway Commission.	
Mo., Carrollton		1 p.m., Feb.	3.. Construction of sluice gate, head walls, etc..... C. E. Jacoby, Engineer.	
Minn., Jackson		1 p.m., Feb.	3.. Judicial ditch construction..... P. D. McKellar, Aud. Jackson Co.	
La., Gonzales		Feb.	4.. Drainage canal construction .....	Len Picard, New River Drainage Dist., President
Conn., Shelton		8 p.m., Feb.	9.. Removal and disposal of ashes and garbage..... Geo. E. Barlow, Warden.	
Ind., South Bend		10 a.m., Feb.	9.. Pipe sewer construction..... Board Public Works.	
Pa., Philadelphia		Noon, Feb.	14.. Brick sewer 10 ft. in diameter..... M. L. Cook, Director.	
Ont., Toronto		noon, Feb.	16.. Refuse incinerating plant..... H. C. Hocken, Mayor.	
Minn., Dumont		8 p.m., Feb.	26.. 1,400 ft. sewer construction .....	J. R. Heidelberger, Vil. Rec.
Minn., Dumont		8 p.m., Feb.	28.. 1,400 ft. sewer construction..... J. R. Heidelberger, Vil. Rec.	
O., Upper Sandusky		Mar.	1.. Ten ditches 40,000 ft. long, 8 to 24-inch tile..... J. Megurat, Aud. Wyandotte Co.	

## WATER SUPPLY.

Ill., Chicago	11 a.m., Jan.	23.. 3,600 tons 12 to 24-inch c. i. pipe.	L. E. McGann, Comr. P. W.
Mich., Kalamazoo	5 p.m., Jan.	25.. 200 tons water pipe..... C. L. Miller, City Clerk.	
N. Y., North Tonawanda	Jan.	25.. Installing a chlorination plant..... Supt. Water Department.	
Ill., Chicago	11 a.m., Jan.	25.. 12,400 tons c.-i. pipe..... L. E. McGann, Comr. P. Wks.	
Pa., Philadelphia	2 p.m., Jan.	26.. Flexible joint cast iron 10-inch water pipe..... Board of Comrs., City of Bordentown, N. J.	
Ill., Chicago	11 a.m., Jan.	26.. 200 tons pig lead..... L. E. McGann, Com. P. W.	
N. Y., New York	8 p.m., Jan.	28.. Cast iron pipe, hydrants, gates, etc..... Park Board.	
N. J., Hawthorne	Jan.	29.. 2,174 tons c.-i. pipe, 6 to 14-inch..... John A. Shea, Borough Clerk.	
N. Y., Bedford Hills	2 p.m., Jan.	29.. Large open well..... James Wood, President.	
S. C., Columbia	10 a.m., Jan.	29.. 10 miles 6 to 12-inch water mains..... S. C. Wyse, Engineer & Supt.	
Mich., Redford	Feb.	1.. Water works system..... John Venus, City Clerk.	
Ill., Joliet	Feb.	1.. Reservoir construction .....	Henry Odenthal, City Clk.
Ill., Anna	Feb.	3.. Improvements to water system..... E. S. Alden, Pres. B. L. I.	
O., Springfield	4 p.m., Feb.	4.. 1,400 bbls. concrete cistern..... Geo. E. McCord, Pres. Bldg. Comm.	
Mass., Fitchburg	Feb.	8.. Reservoir construction .....	Board Water Comrs.
Pa., Philadelphia	Noon, Feb.	9.. Sedimentation basins and 36 and 48-inch c. i. pipe and specials .....	Director Public Works, Bureau of Water.
N. C., Asheville	Feb.	12.. Water pipe and hydrants..... J. E. Rankin, Mayor.	
N. Y., Middletown	4 p.m., Feb.	20.. Laying 6,000 ft. 20-in. water pipe..... J. T. Degman, Comr. P. Saf.	
Greece, Athens	1915, Mar.	30.. Water supply for Athens and additional cities, estimated cost, \$14,000,000 .....	Bur. of Foreign & Domestic Commerce, Wash., D. C.

## LIGHTING AND POWER.

N. Y., New York	2 p.m., Jan.	28.. Installing lighting system in Washington Market..... M. M. Marks, Pres. Borough.	
O., Youngstown		Jan. 29.. Street lighting and power..... V. Heasley, Service Dir.	
O., Toledo	10 a.m., Jan.	29.. Light, heat and power plant..... Board Comrs., Lucas Co.	
W. Va., Wheeling	11 a.m., Jan.	30.. Steel lock gates for Ohio River dam No. 15..... U. S. Engineer.	
La., Harrisonburg	Feb.	5.. Concrete dam, cost \$200,000..... Maj. J. R. Slattery, Box 221, Vicksburg, Miss.	
O., Middletown	Noon, Feb.	11.. Removing old boilers and installing new..... City Commission.	

## FIRE EQUIPMENT.

Ill., Chicago	11 a.m., Jan.	23.. Six fire escapes..... L. E. McGann, Comr. P. W.	
Mass., Salem	Jan.	25.. Two fire stations..... W. O. Arnold, Chief Engineer.	
O., Canton	Noon, Jan.	25.. Triple combination motor pumping engine..... H. H. Heingartner, Secy.	
N. Y., Rochester	Noon, Jan.	25.. Fire alarm system in schools..... Board of Education.	
N. D., Fargo	5 p.m., Jan.	26.. 500 ft. cotton hose, 300 ft. rubber hose..... City Comrs.	
Ind., Indianapolis	Jan.	27.. Two motor pumps and four tractors..... Board of Safety.	
N. J., Hoboken	7 p.m., Jan.	27.. Construction of engine house..... J. H. Londrigan, City Clk.	
Fla., Pensacola	Noon, Jan.	27.. 1,000 feet fire hose..... Board of Comrs.	
Wis., Oshkosh	2 p.m., Jan.	28.. City service motor truck..... Board Public Works.	
O., Youngstown	noon, Feb.	3.. Installation of material for fire and police telegraph system .....	Dept. Public Safety.
Ind., Lafayette	Feb. 10..	Fire hose and reconstruction of motor apparatus..... Board of Works.	

## BRIDGES.

N. H., Concord	Jan.	23.. Four steel truss bridges..... W. B. Howe, City Engr.	
Pa., Pittsburgh	Jan.	25.. Repairs to bridge .....	E. S. Morrow, City Compt.
Wash., Seattle	10 a.m., Jan.	25.. Bridge at 14th avenue..... N. M. Wardall, Clk. Co. Comrs.	
Neb., Kearney	Jan.	25.. 46-foot steel arch bridge..... City Clerk	
Ill., Rockford	10 a.m., Jan.	26.. Two reinforced concrete bridges..... A. R. Carter, Co. Supt. Hwys.	
Ill., Greenville	11 a.m., Jan.	26.. Two span reinforced concrete bridge..... R. O. Young, Co. Supt. Hwys.	
Ill., Vernon	2 p.m., Jan.	27.. Reinforced concrete bridge..... L. S. Trainor, Co. Supt. Hwys.	
Ill., Pecatonica	2 p.m., Jan.	27.. Two reinforced concrete bridges..... H. Schreider, Town Clk.	
Ont., Ottawa	Jan.	28.. Substructure of Pretoria Ave. bridge..... City Council.	
Kan., Salina	Feb.	1.. A \$30,000 conc. bridge over Smoky river at Iron Ave.... County Commissioners	
O., Zanesville	Feb.	1.. 51-foot steel span bridge..... County Comrs.	
Wash., Chehalis	Feb.	3.. Three steel bridges, one wooden bridge & one trestle..... County Commissioners	
O., Columbus	Noon, Feb.	5.. Approaches to bridge; concrete bridge over Indian Run..... Board County Comrs.	
Tex., Waco	Feb.	8.. Iron culverts .....	County Auditor.
Wis., Chippewa Falls	2 p.m., Feb.	8.. Bridge paving with wood blocks; repairing and painting bridge .....	Board Public Works.
Minn., Ivanhoe	1 p.m., Feb.	10.. 30-foot span highway bridge..... J. A. Hensen, Co. Auditor.	
Minn., Faribault	Feb.	10.. Two bridges and one culvert..... City Clerk.	
Alberta, Calgary	10 a.m., Feb.	12.. 540-foot Pratt truss steel bridge..... J. M. Miller, City Clk.	
O., Mansfield	Noon, Feb.	16.. Construction of Black bridge..... John A. Dalton, Aud., Richland Co.	
Ore., Portland	2 p.m., Feb.	23.. Columbia River bridge..... Bridge Comm.	
S. D., Elk Point	Mar.	2.. Bridge construction in 1915 (readvertisement)..... Edward Holden, Co. Auditor	
Wis., Racine	Mar.	15.. Steel bridge .....	Comrs. Racine County
Wis., Racine	Mar.	15.. Steel bridge construction..... Jas. Mutter, Highway Comr.	

## BIDS ASKED FOR

STATE	CITY	RECD UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
MISCELLANEOUS.				
Kan., Leavenworth	....2 p.m., Jan. 23..	4,000 bbls. cement.....	F. H. Duehay, Supt. Prisons, Washington, D. C.	
Tex., Dallas	10 a.m., Jan. 23..	Furniture for Court House.....	C. E. Gross, Co. Aud.	
N. J., Allenhurst	noon, Jan. 23..	Construction of concrete sea wall.....	Chas. K. Savage, Boro. Clk.	
Ill., Chicago	11 a.m., Jan. 25..	600 ft. concrete dock.....	L. E. McGann, Comr. P. S.	
Minn., St. Paul	10 a.m., Jan. 25..	One concrete mixer.....	Aug. Hohenstein, Pur. Agt.	
Ida., Minidoka	2 p.m., Jan. 25..	Electrical apparatus for pumping plant.....	O. H. Ensign, U. S. Reclamation Ser., Los Angeles, Cal.	
Mass., Fall River	Jan. 25..	Police station to cost \$185,000.....	F. M. Corbett, Architect.	
Wash., Tacoma	11 a.m., Jan. 26..	One police patrol and ambulance wagon.....	Comr. Public Safety.	
Neb., McCook	2 p.m., Jan. 26..	U. S. Postoffice.....	O. Wenderoth, Washington, D. C.	
N. Y., New York	noon, Jan. 26..	50,000 yds. riprap stone.....	R. A. C. Smith, Comr. Docks.	
Pa., Beaver Falls	Jan. 26..	One auto street flusher; one garbage collecting wagon; one auto police patrol.....	C. S. Donaldson, City Engr.	
Ohio., Cleveland	Noon, Jan. 29..	Weather-proof copper wire.....	A. R. Callow, Comr. P. & S.	
Pa., Wilkes-Barre	Noon, Jan. 29..	200 two-way street signs; 400 single street signs.....	City Clerk	
Kan., Chanute	Jan. 29..	Construction complete of U. S. Postoffice.....	O. Wenderoth, Washington, D. C.	
N. J., Newark	2 p.m., Jan. 29..	Public market building.....	Committee on Public Bldgs.	
Fla., Bartow	midnight, Jan. 31..	Construction of city hall.....	City Council.	
D. C., Washington	Feb. 1..	Public building, cost \$200,000.....	S. W. Stratton, Dir. Bureau of Standards.	
N. Y., Cleveland	Noon, Feb. 2..	Harbor dock wall and two breakwaters.....	Supt. Public Wks., Albany.	
Utah, Payson	2 p.m., Feb. 3..	Drainage work .....	U. S. Reclamation Service, Provo, Utah.	
Pa., Philadelphia	Noon, Feb. 15..	Two remote control electric winches.....	Geo. W. Norris, Director Dept. Wharves, Docks & Ferries.	
Ont., Toronto	Feb. 16..	Furnaces and appurtenances for refuse incinerating plant.....	Chairman, Board Control.	
D. C., Washington	11:30 a.m., Feb. 24..	Valves and accessories for dry dock.....	Maj. F. C. Boggs, Gen. Pur. Officer.	
Mont., Miles City	3 p.m., Feb. 27..	U. S. post office.....	O. Wenderoth, Washington, D. C.	
Okl., Lawton	3 p.m., Mar. 6..	U. S. post office.....	O. Wenderoth, Washington, D. Co.	

## STREETS AND ROADS

**Alameda, Cal.**—Plans for creation of industrial highway, which will be known under that name and which will run for entire length of city along north side, have been discussed by City Council on recommendation of city planning committee, and city engineer and superintendent of streets have been instructed to prepare preliminary plans for thoroughfare. According to ideas of city planning committee, highway will be continuation of Atlantic Ave. eastward.

**Jackson, Cal.**—Amador County looks with favor upon plan to construct lateral of State highway connecting Jackson with Sacramento as well as with Stockton, according to declaration made by delegation of Amador County citizens to Sacramento Chamber of Commerce.

**Los Angeles, Cal.**—Ordinance has been adopted for paving first alley east of Hill St. from 10th to 11th Sts., also ordinance for improving Avenue 22 from Dayton Ave. to Huron Sts.

**Los Molinos, Cal.**—A number of Los Molinos citizens have presented four petitions to Supervisors at Red Bluff asking that certain roads on colony be declared public highways, and that steps be taken by county in near future to make improvements on at least some of these highways.

**Palo Alto, Cal.**—The Chamber of Commerce has voted to recommend to Board of Public Works that all unimproved streets within city limits of Palo Alto to be improved during coming few months.

**Pasadena, Cal.**—At meeting of Board of Trade directors the streets and boulevards committee announced that it had compiled data as to needs of all roads around Pasadena in way of repairs, and that steps to bring about improvement work were being taken.

**San Diego, Cal.**—City Engineer W. M. Rumsey is preparing plans for another scenic highway to be constructed on Point Loma. It is planned to run along ridge of peninsula about half way between Catalina Blvd. and Rosecrans St. It will be a dirt grade with surface of decomposed granite. Start will be at Rosecrans and Talbott Sts., running west on Talbott to Bow Ave., thence south on Bow Ave. across vacant property to point on crest of summit, thence west to Silver Gate Ave. and following Silver Gate to military reservation.

**San Diego, Cal.**—Board of Supervisors has under consideration five bids for construction of 2½ miles of paved boulevard proposed to be built from Mexican boundary line at Tia Juana to San Diego. Section proposed to be constructed first is from line to Snell's station near San Ysidro. Plans call for 20-ft. width of

stone macadam with strip on each side 5 ft. in width of decomposed granite to be oiled. There is a great variance in bids received. H. G. Fenton is lowest bidder, his bid being \$21,941. Highest bid is considerably more than twice that amount, that bidder being John Engebretsen, and his figure is \$48,600. The other bidders for job are as follows: Isabel Construction Co., \$24,910; Otay Gravel Co., \$30,875; Sweetwater Rock Co., \$33,875.

**San Diego, Cal.**—Controller Chambers, co-operating with state board of control has recommended to state legislature appropriation of \$200,000 during coming season to be used in construction of highway between El Centro, Imperial county, and Yuma, Ariz. Residents of that district asked for \$400,000, but state managers urge that remainder of sum be raised either by private subscription or by application to federal government. Highway projected connects the California Imperial valley with the neighboring state of Arizona.

**San Francisco, Cal.**—Board has resolved on following street improvements: Grading Pennsylvania Ave., between 20th and 22d Sts., the cost being estimated at \$22,000; curbing and paving Corbett Ave., between Danvers St. and Caselli Ave., the cost being estimated at \$19,000; paving Taylor, between Beach and Jefferson Sts., and Arguello Blvd., between Edward and Geary Sts.; paving De Haro St., between 20th and 24th Sts.

**San Francisco, Cal.**—Board has ordered paving of 42d Ave. between Lincoln way and Irving St. and of Lincoln way between 40th and 43d Aves. Sutro estate is to pave Lincoln way west of 43d Ave. The board has resolved on paving Beach St. from Powell to the Embarcadero and Farragut Ave. between Mission and Huron Sts.

**San Jose, Cal.**—Paving of Alviso Rd. is being planned. Surface is to be composed of asphalt and macadam.

**Stockton, Cal.**—Resolution has been adopted for improvement of various streets.

**Bridgeport, Conn.**—After careful investigation of situation, Board of Appraisal has estimated that proposed extension of Harrison St. through south from Fairfield Ave. to State St. will cost approximately \$175,000.

**Bridgeport, Conn.**—At meeting of Common Council Board of Appraisal of Benefits and Damages will submit its estimate of cost of proposed extension of Harrison St. from Fairfield Ave. to State St. This estimated, \$175,372, will include all land and building damages city will have to pay.

**Wilmington, Del.**—In preparing list of streets which they want paved in their respective wards under the \$400,000 bond issue city has authorized, members of

Council have produced total of 343 blocks and have sent list to the street and sewer department for estimate of kind of street to be laid in each section and of total cost. With early start, President Sparks told Council department could pave about 200,000 sq. yds. the coming summer.

**Wilmington, Del.**—For purpose of inaugurating campaign of improvements to streets and sidewalks and county roads as means of providing work for unemployed labor of Wilmington and New Hanover county, City Council and Board of County Commissioners have adopted resolutions to ask legislative authority to issue bonds in sum of \$100,000 and \$50,000 respectively.

**Willow, Cal.**—Glenn County Supervisors have signified their willingness to pay for paving of that part of West Sycamore St. on which Court House faces, and, it is declared, private property owners along remainder of street for four blocks will pave thoroughfare under Vrooman act.

**Bridgeport, Conn.**—Two million, five hundred and ninety-two thousand square yards of oil will probably be spread in Bridgeport during coming summer and already bids have been asked by Board of Contract and Supply for public works department. This will cover two applications. Specifications, which are for delivery and application of the oil, are on file in the office of Contract Board. Bids will be opened at 1 p. m. on Jan. 22.

**Bridgeport, Conn.**—Extension of Elen St. from Harrison St. to West Ave. is being favorably considered. City Engineer A. H. Terry will make tentative layout and prepare rough estimate of cost.

**Stamford, Conn.**—See "Miscellaneous."

**Wilmington, Del.**—See "Miscellaneous."

**Washington, D. C.**—An American consular officer in Latin America reports name of engineer in his district who has recently been put in charge of all Government construction work. Engineer desires to receive catalogues, price lists, etc., in English, on road machinery, rock crushers, dump cars, steam shovels, traction engines using wood and gasoline fuel, contractors' outfits, concrete mixers, pile drivers, dredges, excavators, building materials, cement, iron and steel constructional material, instruments for surveyors, etc., electrical meters, etc., office furniture, structural-steel bridges. Consular officer remarks that he would like to have similar catalogues, etc., for file in the consulate. No. 15,327 Bureau of Manufactures.

**Tampa, Fla.**—Board of County Commissioners has signed contract with Kendrick-Davis-McNeill road contracting firm for completion of Plant City Rd., to be paved with brick from Six-

mile creek to Plant City, a distance of about 14 miles.

**Springfield, Ill.**—Appropriation of \$600,000 to State Highway Commission is allowed by present general assembly and will make available total appropriation of \$4,000,000 for state road improvements for next two years.

**Waukegan, Ill.**—Council has passed ordinances for public improvements to cost about \$12,296.96. Improvements include paving of Ash St. with asphaltic concrete, also resurfacing of West and Julian Sts.

**Indianapolis, Ind.**—Board of Public Works has renewed efforts to pave East New York St. from Arsenal to Tacoma Aves., with view to providing paved thoroughfare to Irvington that will be without street car tracks. Resolutions were adopted for paving New York St. as follows: Arsenal to State Aves., estimated cost \$5,518; State Ave. to Randolph St., estimated cost, \$4,814, and Randolph st. to Tacoma Ave., estimated cost, \$26,589. Estimates on pavements are based on wooden block material. Other kinds of improvements are much cheaper. Board also adopted resolution for paving Rural St. from Washington to New York Sts., the estimated cost being \$14,576. Later board will adopt a resolution for paving Rural St. from New York to Michigan Sts. If the two proposed sections are paved, Rural St. will be improved from Washington St. to Roosevelt Ave. Another resolution adopted is for paving Northwestern Ave. from 15th to 19th Sts., at an estimated cost of \$27,382. Board also adopted resolution for paving Caven St. from East Et. to Madison Ave., at estimated cost of \$11,118.

**Indianapolis, Ind.**—Board has adopted resolution for acquisition of land and construction of boulevard along both sides of Pleasant run, from Raymond to Beecher Sts. Estimated cost is \$87,500. It is estimated land will cost \$56,500 and construction work \$31,000. Board also considered adopting resolution to include acquisition of land and construction of boulevard along stream, from Madison Ave. to Garfield park. It was estimated land and construction work would cost about \$60,000.

**Junction City, Kan.**—Following are bids received for  $\frac{1}{2}$  mile concrete roadway, 16 ft. wide: Glidden & Hobbs, Lawrence, Kan., 95 $\frac{1}{2}$  cts. sq. yd.; A. Jaicks Co., Kansas City, Mo., 97.8 cts. sq. yd.; A. Wagner, Junction City, 98 cts. sq. yd.; W. Fulton, Topeka, Kan., \$1.18 sq. yd.; Siegler Bros., Junction City, \$1.24 sq. yd.; Flower Bros., Junction City, \$1.35 sq. yd. W. V. Buck is County Engineer.

**Richmond, Ind.**—Bond issue of \$100,000 for road improvements is being considered.

**McPherson, Kan.**—City commissioners have ordered plans for about 23 blocks of asphaltic concrete pavement. H. A. Rowland is City Engr.

**Carlisle, Ky.**—A special election will probably be called in Nicholas county for March 28 to vote on proposition of issuing \$125,000 worth of bonds for good road construction in Nicholas county. Petitions asking for vote on proposition are now being circulated and signed by voters of each precinct of county.

**New Albany, Ky.**—Bids on construction of Silver St., from Market St. to Vincennes Rd., New Albany, a distance of 5,660 ft., have been taken under advisement by Board of County Commissioners. There were three bids. The Southern Asphaltine Co. bid \$8,725; W. F. Woodruff, \$9,050, and M. S. Davidson, \$8,090.50.

**Whitesburg, Ky.**—The Letcher Fiscal Court will hold an important session, when subject of building other pieces of model roadway in county will be discussed. A connection between Kona and Flemin of good road now being completed from Mayking to Kona will be arranged and its construction started at once.

**Cumberland, Md.**—Alexander Brown & Sons, bankers, of Baltimore, have been awarded \$150,000 paving bond issue by City Council at special meeting at City Hall, their bid being the highest—\$149,115.

**Beverly, Mass.**—Order has been introduced appropriating \$38,000 for reconstruction of Rantoul St.

**Lowell, Mass.**—A bill providing for completion by state of highway from First St. to Dracut line, through Indian orchard, has been filed by Senator Geo. E. Marchand. Total expense of work is estimated at \$60,000 and bill provides that treasurer and receiver general be

empowered to issue scrip or certificates of indebtedness to amount not exceeding \$50,000, and that highway commission shall expend such further sum from appropriation available for state highways as may be necessary to complete the highway.

**Milford, Mass.**—Selectmen have recommended purchase of new road roller and new boiler for stone crushing plant.

**North Adams, Mass.**—Representative George B. Waterman, of Williamstown, has filed bill that calls for appropriation of \$25,000 for continuance of work on highway between Pittsfield and Williamstown, running through New Ashford and Lanesboro.

**Dowagiac, Mich.**—Board of Supervisors has authorized purchase of quantity of road-making machinery, including a stone crusher with bins and power roller.

**Flint, Mich.**—City Clerk has been instructed by Common Council to advertise for bids for construction of 110,000 sq. yds. of pavement to be built in city during year. There are 27 pavement jobs and all are to be bid on separately according to specifications in hands of city engineer.

**Grand Rapids, Mich.**—Board of Supervisors for Kent County has voted to issue as of date of Jan. 8, 1915, the remaining \$100,000 of the \$600,000 road construction bonds authorized in 1912.

**Lapeer, Mich.**—Proposition to bond Lapeer County for \$400,000 for highway improvement work will be submitted to taxpaying electors of county at spring election on April 4 next.

**Monroe, Mich.**—State Highway Commissioner Rodgers is discussing with the County Road Commissioners and the road committee of Board of Supervisors plans for financing and building Monroe's share of 16-ft. macadam highway between Monroe and Toledo. Should proposed plans meet with approval of State Highway Commissioner, work on survey will be commenced next week. It is proposed to build 7 miles this year, 3 $\frac{1}{2}$  miles south of Monroe and 3 $\frac{1}{2}$  miles north of Ohio-Michigan line, remaining 7 2-10 miles in 1916.

**Aurora, Minn.**—Election has been called for Jan. 27 for voting on two bond issues. One issue will be for \$40,000 and will be for paving Third Ave. and on Second Ave. from Railroad Ave. to the end of the village; also to pave Birch St. from Third Ave. to Hearing school building.

**Duluth, Minn.**—See "Sewerage."

**St. Joseph, Mo.**—Improvements in prospect under jurisdiction of park board of St. Joseph, and which probably will be completed by next summer, mean expenditure of almost \$150,000. Largest work is paving of Noyes boulevard, north and south. That will involve expenditure of more than \$110,000. The other improvements are resurfacing of Ashland Ave. from the north end of Noyes boulevard to Lovers lane, costing about \$25,000, and a number of minor projects.

**St. Paul, Minn.**—Edgecumbe Rd. will be laid out after manner of Summit Ave. About 2 miles of road are to be graded and improved.

**St. Paul, Minn.**—Ordinances have been passed for improvement of various streets.

**St. Paul, Minn.**—Preliminary orders for grading of several streets have been introduced into council by Councilman M. N. Goss, commissioner of public works, at request of North Central Commercial Club.

**Asbury Park, N. J.**—Ordinance providing for issuance of \$150,000 worth of improvement bonds, to pay for paving of Ocean Ave., Deal, and work to be done this spring at beach casino, has been passed by Deal Board of Commissioners.

**Elizabeth, N. J.**—Borrowing of \$500,000 for use of new Board of Works is advocated by Frank Bergen for various street improvements.

**Haddonfield, N. J.**—Final agreement by state, county and borough has been signed by Borough Commissioners for improvement of King's Highway. It provides for regrading and repaving of this ancient road and construction of a concrete bridge over Cooper River. Entire improvement will cost about \$45,000.

**Passaic, N. J.**—City Clerk has been instructed to advertise for bids for improvement of Bond St. Bids will be received and opened on Jan. 25, and also to advertise for bids for repairing storm water sewer in Hope Ave., bids to be opened on Jan. 25.

**Rutherford, N. J.**—With view to bringing about permanent pavement on Union Ave., in Rutherford, something of

asphalt type, members of borough council are now studying specifications. It is likely that there will be something of definite move made in this direction at next meeting.

**Westfield, N. J.**—Macadamizing of Alston Rd. from Westfield Ave. to Lambert's Pond is being discussed.

**Brooklyn, N. Y.**—Jamaica Ave., the principal artery of travel from all sections of Brooklyn, to old town of Jamaica, may be widened to accommodate not only vehicular traffic, but also elevated extension, which Brooklyn Rapid Transit Co. proposes to operate there under dual system contract.

**Forestville, N. Y.**—Special election will be held for voting on paving of portion of Main St.

**Lestershire, N. Y.**—A new highway will be constructed between this village and Endicott during coming season.

**Lowville, N. Y.**—A petition will be circulated among property owners in Shady Ave. for pavement to extend from corner of Shady Ave. and State St. to depot, a distance of 1,300 ft.

**Newburgh, N. Y.**—City Engineer Blake has been instructed to prepare estimates for paving of Broadway from West St. to Wisner Ave.; also for paving of Mill St.

**Niagara Falls, N. Y.**—City engineer has been directed to prepare estimates for paving work this year.

**Rochester, N. Y.**—Following first ordinances have been adopted: General street sprinkling ordinance for 1915; opening of Wilson Terrace from Thurston Rd. to City line, estimated cost, \$1,000; Culver Road asphalt pavement, Atlantic Ave. to Rosewood Terrace, \$69,000; Syke and Ames St. sewer, \$2,700; Syke St. sewer, Child to Colvin St., \$1,500; Syke St. asphalt pavement, \$12,000; amending ordinance for Thomas Creek and Blossom Road storm sewer. Final ordinances were adopted as follows: Culver Road asphalt pavement, from Rosewood Terrace to Clifford Ave., estimated cost, \$49,000; Bricker St. sewer, \$7,000; Hillcrest and Erickson Ave. and Norton St. sewer, \$13,000; Gilman Ave. walks, grading and sewer, \$2,000.

**Yonkers, N. Y.**—Resolution has been adopted directing the city engineer to prepare plans and specifications for regulating, grading and otherwise improving of Wilson Pl., from Chase Ave. to Morsemere Ave.

**Cincinnati, O.**—Number of street improvements have been planned.

**Cincinnati, O.**—Bids will be received at office of the Auditor of City of Cincinnati, O., until 12 o'clock noon of Feb. 11, 1915, for purchase of bonds in sum of \$280,000, for purpose of providing funds for resurfacing, repairing and improving certain existing streets and public highways in the city of Cincinnati.

**Columbus, O.**—About \$5,000,000 will be spent for roads by the state highway department this year, instead of \$7,000,000 spent in 1914.

**Connellsburg, O.**—Ordinance is being considered authorizing and directing issue and sale of bonds of City of Connellsburg, amounting in aggregate to one hundred thousand (\$100,000) dollars, proceeds of which shall be used, first, for payment of the unfunded debt of said city, aggregating approximately fifty-six thousand (\$56,000) dollars, and, second, for permanent improvement of streets and highways by opening, grading, paving, sewerizing and otherwise.

**Coshocton, O.**—Petition will be presented on Feb. 15 to county, asking for construction of road near Ruliff Hill, and near where public road crosses southern section line of Section 16, Range 9, Township 4.

**Coshocton, O.**—State aid has been asked for paving street through Roscoe.

**Coshocton, O.**—Fifth St. is to be paved from Walnut St. to Pine St. if Council passes ordinance which will be introduced at first 1915 meeting. It was estimated that improvement will cost between \$10,000 and \$12,000.

**Coshocton, O.**—County Commissioners may be asked to build brick road from Randles bridge to Muskingum county line below Wills Creek if plans of J. W. Vensil, Adamsville farmer, carry.

**Coshocton, O.**—No bids were received at State Highway Commissioner James Marker's office, at Columbus, for paving with waterbound macadam Section A of the Walhonding-New Guilford Rd., in Coshocton County. It was decided to re-estimate and readvertise the work. Piece of road to be improved is 12,505 ft. or 2.37 miles long.

**Dayton, O.**—Property owners on Main St., representing 1,727 ft., have filed communication with Commission, asking that in event it is decided to pave Main St. within near future, vitrified brick be used as paving material. Total front footage is approximately 3,900 ft.

**Geneva, O.**—Ordinance has been passed to improve Depot St. by grading, draining, curbing and paving.

**Hamilton, O.**—City Civil Engineer F. E. Weaver has submitted plans, profiles and specifications for improvement of alley between Edgewood Ave. and Phillips Ave., estimated cost, grading and graveling, \$1,694.

**Lisbon, O.**—Emerson Campbell, of St. Clairsville, auditor of Belmont County, Board of County Commissioners and Prosecutor Vodrey are discussing question of issuing county bonds for purpose of improving county roads.

**Marion, O.**—Petition asking for improvement of Lee St., from Silver St. to Garden City pike, by construction of water, gas and sewer mains and water-bound macadam road, with curb, has been referred to street-and-alley committee.

**Mansfield, O.**—Ordinances have been passed for improvement of various streets.

**Mansfield, O.**—Five streets are to be improved during coming summer by paving roadways with brick or block. These streets are Wayne, from 4th to Spring; Altamont, from Diamond to Chestnut; East Dickson Ave., from Diamond to Franklin; East 5th St., from Adams to the railroad tracks, and Mulberry, from Spring Mill to Harker.

**Paulding, O.**—Bids will be received by E. McGaharan, Auditor, until 3:30 p. m., Feb. 22, for purchase of \$29,860 worth of pike bonds.

**Troy, O.**—Bids will be received by Director of Public Service, Jan. 27, 1915, for paving of Market St. with asphaltic concrete. Following are engineer's estimate of quantities: 13,700 sq. yds. of asphaltic concrete paving, laid complete, at \$1.75—\$23,975; 4,416 lin. ft. of combined curb and gutter at 40 cts.—\$1,766.40; 386 lin. ft. of header curb at 30 cts.—\$115.80; 570 lin. ft. of 18-in. sewer, laid complete, at 70 cts.—\$399; 36 lin. ft. of 15-in. inlet connections, complete, at 60 cts.—\$21.60; 120 lin. ft. of 12-in. inlet connections, complete, 50 cts.—\$60; 6 cast iron inlets, in place, at \$9—\$54; 1 manhole, complete, at \$25—\$25; total estimated cost, \$26,416.80. Bids will also be received on paving of street car tracks; 4,160 sq. yds. of asphaltic concrete paving in D. & T. tracks at \$1.75—\$7,280. M. A. Gantz is City Engineer.

**Tulsa, Okla.**—Resolution has been adopted declaring necessity of and providing for improvement, by grading, paving, curbing, guttering and draining certain portions of following named streets and avenues in "West Tulsa," as follows: Bridge St., Main St., Factory Ave. and Mitchell Ave.

**Tulsa, Okla.**—A resolution has been adopted declaring necessity of and providing for improvement by grading, paving, curbing, guttering and draining certain portions of following named streets and avenues in city of Tulsa, Okla.: Detroit Ave., 18th St. and 19th St.

**Eugene, Ore.**—City engineer has been instructed to prepare his plans for widening of Eighth Ave. from Charnelton St. to Blair Blvd. Curb on each side will be placed back 3 ft., according to agreement with the P. E. & E., which has consented to pay \$3,500 of the cost. Work will be done early in spring.

**Beaver, Pa.**—Two routes for road that will afford outlet to large section of country including Potter Township, give Monaca, Rochester, Beaver and other valley towns better means of communication with south side of the county, and at same time give a way by which proposed new county home can be reached at any time in year, are being considered.

**East Stroudsburg, Pa.**—Resolution has been passed by Council to ask for bids to install a comprehensive lighting system consisting of pole lights, to curb and gutter and cover entire Main St. from State Bridge to Milford Crossing with some material to present the best surface on top of present macadam. Committee of three has been appointed to get inside information and report at next meeting, of which Louis Ruprecht is Chairman.

**Indiana, Pa.**—Indiana will spend \$10,000 for road improvements in 1915, and

work will be started as soon as weather permits. One of proposed improved sections begins at intersection of Philadelphia and 5th Sts. and runs east on Philadelphia St. to borough line, a distance of 2,700 ft.; second begins at the B. R. & P. right of way on Philadelphia St. and runs west on Philadelphia St. to borough line, a distance of 3,300 ft., and third begins at intersection of Philadelphia and 5th Sts. and runs north on 5th St. to borough line, a distance of 2,200 ft.

**Johnstown, Pa.**—Among streets paving of which are recommended are Franklin to Napoleon, Napoleon, Dibert, Railroad, Hinckston Ave., Park Pl. and Bausman Alley.

**Lebanon, Pa.**—Ordinance has been passed authorizing paving of Ninth St. from Willow St. to Chestnut St.

**Pottsville, Pa.**—Widening of Norwegian St. is being discussed.

**West Reading, Pa.**—Residents of West Reading have voted down loan of \$25,000 for improving highways and purchasing stone crusher, etc.

**Wilkes-Barre, Pa.**—Schedules of paving work to be done by city during coming summer have been prepared by Bureau of engineering, work being divided into sections, and bids will be asked on various sections in hope of securing lower figures. It is intention to ask for bids on paving work within a few weeks. One section will be for new asphalt paving on sections of following thoroughfares: Magnolia and O'Neil Aves., Kirkendall lane, Emily court, Charles, Walnut, Welles, Dana, Kinney, Church, Maple, Lincoln, Beaumont, Hancock and Blackman Sts. In all there will be 23,386 ft. of curbing and 30,214 yds. of paving. In another section will be repaving with asphalt. Wood St. from Carey Ave. to the railroad, South Main from South to Ross Sts., and North River St. from Courtright Ave. to the City hospital will be repaved. There will be 2,200 ft. of curbing and 10,039 yds. of pavement to be laid in this section. New brick work is to be done in these sections. One will cover work on Kidder and Scott Sts. and Conyngham Ave., where there will be 10,220 ft. of curbing and 14,897 yds. of paving to be done while another section will cover Hollenback Ave., Race, Hancock and Jones Sts. This will contain 6,778 ft. of curbing and 9,020 yds. of paving. The third section will cover Blackman and Stanton Sts., where 10,600 ft. of curbing and 16,466 yds. of paving is to be laid. Another section will cover repaving work on High and Grove St. from Hazel to Stanton Sts. Brick will be used and 3,680 ft. of curbing and 5,080 yds. of paving will be laid. In this section also will be the repaving of Foster lane between Darling and Court Sts. with cobblestones. Here there will be 600 ft. of curbing and 600 yds. of paving. The section also includes work on East South St. between Lincoln and Sheridan Sts., where brick and macadam pavement is to be laid. There will be 5,112 ft. of curbing, 1,100 yds. of macadam and 6,462 yds. of brick.

**East Providence, R. I.**—Town Engineer Waterman has been instructed to advertise for bids for block paving to be ready for consideration at February meeting of board.

**Providence, R. I.**—An act authorizing city of Providence to hire sum of \$100,000 with which to make highway improvements and incidentally to give work to unemployed was introduced in House yesterday by Representative Thomas J. O'Neil of Providence. Bill provides that money shall be equally divided among 10 wards of city, each ward to have \$10,000 worth of highway improvements.

**Providence, R. I.**—Plans for development of that section of South Providence lying between Eddy St., Allens Ave., Public St. and Earnest St. have been considered by special committee of City Council relative to improvement of land in Sixth Ward and City Planning Commission.

**Charleston, S. C.**—Alderman Bold has introduced petition requesting that Meeting St., between Shepard and Mount Pleasant Sts., be paved with wood blocks or other material, and that sidewalks on each side of street be paved.

**Sioux Falls, S. D.**—It is said that \$1,229,000 will be expended during 1915 on good roads in South Dakota.

**Chattanooga, Tenn.**—County Court has adopted resolution memorializing Legislature to abolish Hamilton County Road

Commission and put supervision of road work back into hands of court. County attorney was instructed to draft bill for this purpose, to be submitted for approval to county court. Court also asked Legislature to authorize county to issue bonds of \$125,000 for Wauhatchie road around Point Lookout and \$228,000 for building new school houses.

**Clinton, Tenn.**—See "Bridges."

**Jellico, Tenn.**—Campbell County has voted bond issue of \$150,000 for building and repairing roads.

**Maryville, Tenn.**—Voters of Blount County will vote on \$300,000 bond issue for pikes according to action of County Court.

**Benton, Tex.**—County Commissioners have granted election for \$3,000 bond issue in road district No. 15. This district lies between Summers Mill and Sulphur Springs districts. Election to be held Feb. 13.

**Bonham, Tex.**—Good Roads Commissioners have definitely decided to construct good roads in this district of rock instead of gravel. Three layers of rock will be used. Contractors announce that they will be ready to begin work by Feb. 1.

**Bryan, Tex.**—Another good roads bond petition is being circulated in this county, and already has far more signatures than enough to secure order of election from Commissioners' Court. The petition is for an issue of \$450,000.

**Corpus Christi, Tex.**—City Council has set Friday, Feb. 5, as date for special election at which time property owners will determine whether or not bonds in sum of \$100,000 shall be issued to pay city's one-fourth pro rata of street paving on streets most in need of paving.

**Corsicana, Tex.**—Mayor Halbert and paving committee of City Council has instructed Mr. Duren, city engineer, to begin at once preparation of plans and surveys for 2d Ave.

**Denison, Tex.**—The building of additional good roads in Grayson County, to cost approximately \$1,000,000, and which would give this county best good roads system in Southwest, totaling 320 miles, is being seriously considered. The proposition is to construct about 200 miles of macadam roads in Grayson County in addition to good roads now in Denison-Sherman districts, about 120 miles. While details have not been worked out, proposition is to construct belt road about 100 miles long connecting all principal towns and communities in county, then build 100 miles of laterals so that nearly every section of county will be in reach of a good county road and can construct dirt or other local roads to connect with main system.

**Fort Worth, Tex.**—City Commission has ordered that Clinton Ave. and Houston Sts., in North Fort Worth, be paved in accordance with contracts entered into two years ago.

**Fort Worth, Tex.**—Estimates totaling nearly half a million dollars for street department are included in report of Street Commissioner Grant. He proposes to include in his request for appropriation practically all of improvements needed. Of amount needed, there is a prospect of getting about \$120,000, he said. Following items will be included in his request for an appropriation: Storm sewers, \$150,000; city's part of paving contracts already awarded, \$54,048; resurfacing Main St., \$25,000; resurfacing Jennings Ave., \$34,500; completion of Allen Ave. Viaduct, \$25,000; extensions of roads to cardinal highways of county, \$18,000; upkeep of graveled streets, \$20,000; graveling streets, \$6,500; grading streets, \$15,000; widening South Main St., \$3,000; repairs to defective gutters to save paving, \$6,000; painting Jennings Ave. Viaduct, \$1,800; repairs to public buildings, \$6,000; general improvements, \$9,530. These are the items included in report of City Engineer Von Zeuben. Other items not included in this report are: Granery for street department, \$1,200; sweeping machines, mules and wagons, \$4,000.

**Galveston, Tex.**—Commissioner Norman has moved that Commissioners advertise for bids on 12 blocks of this paving on Ave. H, the streets not to be designated now. It was later decided to advertise for bids on paving in terms of square yards instead of as 12 blocks.

**Bristol, Va.**—City has notified Bristol Traction Co. that it will begin, as soon as weather conditions will permit, the macadamizing of Euclid Ave. and Chester St. to Moore St., and Moore St. to

Harmeling St. The traction company has tracks on these streets and is requested to be prepared to macadamize its section of the street as city does its work.

**Norfolk, Va.**—According to estimates prepared by W. H. Taylor, Jr., assistant city engineer, city will spend \$29,019.18 to complete extension of Olney Rd. to Granby St.

**Norfolk, Va.**—The Granby Street Improvement League has adopted resolution for presentation to Council asking that balance of \$50,000 appropriated for Olney Road extension be used as provided in original ordinance for constructing bridge across Smith's Creek at Duke St.

**Kelso, Wash.**—Delegations of citizens from Kelso, Cathlamet, Ilwaco and other points on lower Columbia river will meet at Cathlamet to plan ways and means by which proposed state road from Kelso to coast at Ilwaco may be furthered. Wahkiakum county at last election voted \$75,000 bonds for this road project, and Charles I. Signor, an engineer representing state road department, is now surveying general route.

**Morton, Wash.**—At special meeting of Morton Council street and alley committee was given power to act in securing engineer to draft plans and specifications for grading and planking of Main St. from Railroad to 3d Sts. Phil S. Armstrong was hired for job.

**Olympia, Wash.**—If tentative public highway building program as outlined by Highway Commissioner William R. Roy and Engineer James Allen, and approved by Highway Board, is indorsed by Legislature when it convenes this month, Pacific highway will have \$600,000 worth of work done on it during coming two years. Program mapped out, and which will be submitted to Legislature, provides for expenditure of \$250,000 on Pacific highway north of Tacoma and \$350,000 south of Tacoma. Following is apportionment of amount to be expended among various highways designated by last Legislature as primary highways: Western Washington: Pacific highway—Tacoma north, \$250,000; Tacoma south, \$350,000; Sunset highway, \$75,000; McClellan Pass highway, \$30,000; National Park highway, \$200,000; Olympic highway, \$200,000; State road No. 8, \$150,000; State road No. 10, \$25,000. The \$75,000 item for the Sunset highway is in addition to \$80,000 to be reappropriated. Eastern Washington: Inland Empire highway, \$210,373; Sunset highway, \$129,460; Ritzville to Spokane, \$64,730; Nos. 10 and 12 in Okanogan county, \$64,730; No. 4 in Ferry county, \$32,365; Mead to Newport in Pend Oreille county, \$113,278.

**Seattle, Wash.**—Resolution has been passed appropriating sum of \$5,000 to city of Seattle to aid in improvement of 1st Ave. S., Local Improvement District 2768.

**Vancouver, Wash.**—State will spend \$60,000 this Summer on improvement of Pacific Highway between end of present hard-surfaced roadway six miles out from Vancouver to La Center. This money will grade and prepare for top dressing of entire 10 miles of roadway, connecting up hard surface road with that graded between La Center and Woodland last year.

**Janesville, Wis.**—Supervisor Treadway has submitted report of highway committee to County Board, in which it was recommended that Board make provision for oiling county highways during coming season. Equipment for work, the committee estimated, would cost \$835, and would include an oiling outfit and sweeper.

**Milwaukee, Wis.**—A big improvement which will be advanced as rapidly as possible will be construction of Lake Shore Drive from Wisconsin St. north to McKinley Park, under direction of Park Board. Provision is made in municipal budget of 1915 to obtain sum of \$300,000 from sale of bonds, to be expended on the drive.

**Superior, Wis.**—At meeting of City Commission resolution introduced by Commissioner Tomlinson was passed instructing Board of Public Works to prepare plans and specifications for paving Tower Ave. from 1st to 3d St. It is probable that lower Tower will be paved with brick or sandstone.

#### CONTRACTS AWARDED.

**San Diego, Cal.**—For construction of 164,794.18 sq. ft. of asphalt paving on concrete base on Fourth St. to California-Arizona Const. Co., San Diego, at \$1.87, or total bid of \$36,576.93. Con-

tract includes 3,001.13 lin. ft. curb. A. H. Wright is City Clerk.

**San Francisco, Cal.**—Contract to pave Powell St. from Sutter to Bush with vitrified hillside brick has been awarded by Board of Works to Eaton & Smith for \$2,572.

**San Francisco, Cal.**—Board of Works has awarded contract for paving 5th Ave. from Geary to Fulton St. to F. Ritchie & Co. for \$5,604. This firm was lowest bidder also for paving the north half of Clement St. from 33d to 38th Aves., but interlineation on proposal form made its bid void, and contract was given to Flinn & Treacy for \$7,911.

**Darien, Conn.**—New road will be constructed to Tokeneke. Contract for new road goes to G. F. Pentecost, Jr., whose bid was \$5,900 for making the road and removal of Austin house. Remainder of appropriation of \$10,000 goes for land damages.

**Hartford, Conn.**—By State Highway Commissioner for construction of about 4,344 lin. ft. of special 6-in. gravel road in East Lyme to A. B. Caldwell, New Britain, at \$7,493.

**Fort Pierce, Fla.**—By St. Lucie County Commissioners, to J. G. Coats & Co., Fort Pierce, to complete \$14,000 contract on road south from Fort Pierce.

**Tampa, Fla.**—Board of Public Works has let contracts for nearly 80,000 sq. yds. of brick paving, greater part of it to Georgia Engineering Co. Average cost at which streets embraced in contracts let will be paved is \$1.40 per sq. yd. Paving material is vitrified brick, with granite curbing. Work will cost considerably more than \$100,000.

**Brownstown, Ind.**—To C. O. Robertson, city, at \$13,615, Beabout, Jennings, & Mayberry, Seymour, Ind., at \$3,490, and Ephriam Brown, Kurtz, Ind., at \$2,098, for grading, draining and graveling of three roads.

**Shelbyville, Ind.**—County Commissioners have awarded contracts for improvement of Boals Road in Brandywine Township and Mutz Road in Jackson Township. Goodrich & Carey were successful bidders for first, at \$2,969.59, and Harvey Oltman for second, at \$1,360.

**Valparaiso, Ind.**—For paving with stone contract has been awarded to Green & Coplin, Valparaiso, Ind., at \$14,450. One other bidder was Roy Demass, Chesterton, Ind., at \$14,660.

**Louisville, Ky.**—Contracts for construction of Market St. and Western Parkway have been awarded to F. G. Breslin at about \$74,000.

**Louisville, Ky.**—Contract for reconstruction of Hill St. between Fourth and Sixth, has been awarded to American Standard Asphalt Paving Co. by Board of Public Works. The company made lowest bid at \$7,950 for the work.

**New Albany, Ky.**—By Board of County Commissioners to M. S. Davidson, of Louisville, contract for construction of Silver St. The thoroughfare is to be improved under provision of Indiana three-mile free gravel road law from Market St. to Charlestown road, a distance of 5,660 ft. The contract price was \$8,090.50. There were two other bidders, W. F. Woodruff, of Louisville, \$9,050, and the Southern Asphaltaline Co., \$8,725.

**Alexandria, La.**—By City Commissioners, to Gailey & Clark, to resurface 3d St. from Elliott to Bellier St. with bituminous.

**Jackson, Miss.**—For resurfacing Capitol St. with asphalt, contract for materials have been awarded as follows: Barber Asphalt Paving Co., Philadelphia, Pa., for asphalt at 10 cts. per gallon; Birmingham Coal & Lumber Co., Jackson, Miss., for screening at \$2.40 per cu. yd., and T. J. O'Ferrell for sand at 65 cts. per cu. yd. City will do the work. L. A. Scott is City Clerk.

**Independence, Mo.**—By Jackson County Commissioners, to Davidson Construction Co., of Kansas City, at \$13,987, to grade and drain Blue Mills and Sibley Rd., about 6 miles.

**Hammonton, N. J.**—To Burke & Bonham, Inc., Plainfield, N. J., contract for \$51,000 cu. yds. excavation, 160,000 sq. yds. gravel surface, 4,000 sq. yds. macadam, guard rails, culverts, etc.

**Kansas City, Mo.**—By city, to Tyner Construction Co., at \$10,207, to pave 27th St., from Lister to Van Brunt St., with concrete.

**Liberty, N. Y.**—Contract for building of Fosterdale-Mongaup Valley Rd. has been let to Fulton Engineering Co. at Albany. Their bid was \$103,314.50. Road is 10.97 miles in length.

**Saranac Lake, N. Y.**—John B. Dower of Ballston will build two pieces of state highway in Saranac Lake village necessary to complete trunk line through village. Broadway, from New York Central tracks to corporation line, and River St., between Church St. and Shepard Ave., are the pieces, and Mr. Dower's bid of \$3,613 for two jobs was lowest submitted. They total .22 miles in length. Part I of Lake Placid-Jay Rd. will be built by Keeseville Road Co., whose bid for 10.15 miles was low at \$92,249.50. Same concern was low on construction of 5.98 miles of road between Schroon Lake and Ticonderoga, bidding \$54,693.

**Hamilton, O.**—To Garver & Wirtz, city, contract to pave Symmes Corner road, for \$57,470.

**Troy, O.**—To Myers & Cole, Dayton, at \$6,427, for grading, macadamizing and surfacing with Bermudez asphalt the Dayton and Troy Spur and One Mile Assessment Pike.

**Portland, Ore.**—Contract for paving of East 4th St., between East Lincoln and Division, has been awarded by Council to Cochran, Nutting & Co., for \$4,055.95, concrete type of paving being specified. Bid of Giebsch & Joplin of \$4,046.31 for asphaltic concrete was lowest, but 72 per cent. of property owners desired concrete and Council granted their petition.

**Chattanooga, Tenn.**—By Hamilton County Road Com., to Noll Construction Co., of Chattanooga, at \$12,513.28, to pave Main Ave., North Chattanooga, with asphalt macadam on bituminous concrete base.

**Knoxville, Tenn.**—For macadamizing 80 miles pikes awarded by Morgan County to Oliver & Hill, Maryville, and Solomon Constr. Co., Harriman, at \$270,000.

**Wartburg, Tenn.**—By Morgan County Commissioners, to Oliver & Hill Construction Co., of Maryville, and Solomon Construction Co., of Harriman, to macadamize 80 miles of road.

**Austin, Tex.**—City Street Department has let contract to J. R. Canon for improvement of 1st St., in South Austin, for distance of about one mile. First St. is first st. west of South Congress Ave. and parallel with it. Contract was awarded on unit plan, and will probably amount to about \$1,500.

**Bonham, Tex.**—For constructing 14 miles roads leading north and south of Bonham to Owens Constr. Co., Vicksburg, Miss., at \$66,488.

**San Antonio, Tex.**—To Rushmore & Gowdy, at \$3.18½ per sq. yd. on 3½-in. creosoted pine blocks for paving of W. Commerce St., Santa Rosa Ave. to Cameron St.

**Richmond, Va.**—For completing extension of Grace St. by Administrative Bd. to H. H. George, at about \$20,000.

**Seattle, Wash.**—To W. W. Wilcox, R. F. D. No. 3, Seattle, at \$30,866, for grading of 14th Ave., S. Road.

**Tacoma, Wash.**—Council has authorized Public Works Commissioner Woods to enter into contract with the St. Paul & Tacoma Lumber Co. for laying creosote wood block pavement in Puyallup Ave. between Pacific Ave. and A St. Company has agreed to furnish the blocks free for purposes of advertisement, if city will pay for creosoting and laying.

**Point Grey, B. C.**—For paving hill section of University Ave. to Cotton Co. at approximately \$11,000.

#### SEWERAGE

**South Pasadena, Cal.**—City has been authorized to issue bonds in sum of \$200,000 for construction of complete sewer system. B. V. Garwood is City Clerk.

**Lodi, Cal.**—Remodeling of city's septic tank is being discussed.

**Bridgeport, Conn.**—Installation of adequate sewers is being considered.

**Stamford, Conn.**—See "Miscellaneous."

**Wilmington, Del.**—See "Miscellaneous."

**Jacksonville, Fla.**—According to rough estimate of city engineering department, there are at least 15 miles of streets in city which are now in need of drainage and repairs.

**Quincy, Ill.**—Several sewer extensions have been authorized on Oak St.

**Fort Wayne, Ind.**—Engineer Randall has received orders from Board of Works to prepare plans for comprehensive sewer system to drain Spy Run and also for sewer to drain territory lying

east of Wabash Ave., south of Maumee, west of Roy and north of Pennsylvania tracks. This sewer will empty directly into Maumee river at point near mouth of interceptor, while Spy Run terminal has not been decided upon. It will be necessary to lift it over St. Mary's river and into interceptor in some manner. A local sewer also has been ordered for alley between Hoagland Ave. and Webster St. from Rudisill to Lexington Ave.

**Indianapolis, Ind.**—Resolution has been adopted for main sewer in East Tenth St. from point 45 feet east of Denny St. to Euclid Drive. Estimated cost is \$4,500.

**Indianapolis, Ind.**—City administration has prepared bills to provide funds for building sewage disposal plant and for flood prevention work. Both bills contemplate an increase in taxes by providing additional special tax levies.

**Leavenworth, Kan.**—Resolution has been adopted for construction of 8-in. sanitary sewer in various streets. Fred Metschan is City Clerk.

**Pittsburg, Kan.**—Following are bids received for vitrified pipe sewer construction. Work consists of about 2,143 ft. 8-in. pipe. Williams Construction Co., Joplin, Mo., \$1,928.70 and \$6 per cu. yd. for extra concrete; A. G. Robson, Pittsburg, \$1,625.25 and \$6 per cu. yd. extra concrete; Tom L. Green, Pittsburg, \$1,620 and \$5.50 per cu. yd. extra concrete. L. E. Curfman is City Engineer.

**Pittsburg, Kan.**—Ordinance has been adopted to provide for issuance of Internal Improvement bonds of City of Pittsburg in sum of \$2,205.14 to pay for construction of certain sewer laterals in City of Pittsburg.

**Duluth, Minn.**—Following sewer improvements have been ordered: Sanitary sewers in 11th St., between 13th and 14th Aves. east at a cost of \$2,500; Ninth St., between Fourth and Fifth Aves. east, at a cost of \$700; 68th alley west, between Main and Polk Sts., at a cost of \$1,000; storm sewers in Sixth St., between 15th and 17th Aves. east; 58th Ave. east, between London road and Superior St., and 19th Ave. east, between Fifth and Sixth Sts.

**Duluth, Minn.**—Pavements, street improvements and the construction of storm and sanitary sewers throughout city at estimated cost of \$230,000 have been ordered by City Commission. The repaving of East Superior St., from 16th to 23rd Aves., and paving of Third St. and Grand Ave., from Vernon St. to 54th Ave. west, are the two biggest jobs ordered at meeting.

**St. Paul, Minn.**—Ordinances have been passed for construction of sewers in various streets.

**Virginia, Minn.**—City Council has allowed Lawrence-McCann Co. \$16,824 estimate on sewer extension work. Council has voted to install the Fairview addition sewer by day labor.

**Virginia, Minn.**—At next meeting of City Council Mayor Boylan will recommend that storm and sanitary sewers be put in alleys on both sides of Chestnut St., so that overflow from roofs, drains and other sources can be taken care of. It was planned to build sewers later in year, but Mayor believes work can be done cheaper now by day labor and will furnish much winter employment for men. The new sewers will be connected with the big 6-ft. sewer, recently completed.

**Passaic, N. J.**—Bids will be opened Jan. 25 for repairing storm water sewer in Hope Ave.

**Paterson, N. J.**—Ordinance will be introduced providing for largest single bond issue this city has ever undertaken to launch. It will be for \$1,000,000 worth of trunk sewer bonds, securities to be used to pay off part of city's indebtedness in connection with cost of trunk sewer.

**Pitman, N. J.**—Pitman Council has authorized engineer to prepare survey of town for sewer system.

**Trenton, N. J.**—Mayor Donnelly and City Commissioners have gone over plans and specifications for a \$366,850 sewage-disposal plant for Trenton. The plans were submitted by Hering & Gregory, consulting engineers, of New York City, employed to take charge of sewage-disposal question here. It is estimated that cost of operation of plant will be \$27,300 annually, which, with bond and sinking charges of about \$30,000, will make additional fixed expenses of about \$57,300 for Trenton. Capacity of proposed plant is about 25,000,000 gallons every 24 hours.

**Ventnor, N. J.**—Bond issue of \$75,000 has been voted to defray expenses of installing sewerage disposal plant.

**Huntington, L. I., N. Y.**—A modern sewer system is assured for this village by action of Town Board, which has issued order creating proposed sewer district and appointing former Supervisor Edward S. Ireland, Chauncey M. Felt and David Whipple commissioners. The district boundary on south is the Long Island Railroad. Mains will extend down New York Ave., Nassau Ave. and Spring St. to Main St. District will widen out to west before reaching High and Fairview Sts. to take in Woodbury Ave. and Cold Spring Hill section and West Neck Ave. It will also extend in easterly direction to take in high school. It will extend north to Millpond.

**New Rochele, N. Y.**—Purchase of Glen Island for public park and site for sewage disposal works and garbage destructor is advocated.

**Ningara Falls, N. Y.**—About \$100,000 will be expended this year on sewer improvements.

**Rochester, N. Y.**—See "Streets and Roads."

**Yonkers, N. Y.**—Resolution has been adopted directing the city engineer to prepare plans and specifications for sewer in Vineyard Ave., from point 400 ft. north of High St. to Glenwood Ave., and plans and specifications for a sewer in Vernon Pl., from Yonkers Ave. to St. James' terrace.

**Cincinnati, O.**—Ordinance has been passed for sewerage of Pinetree St.

**Cincinnati, O.**—Large amount of sewer improvements are being planned.

**Coshocton, O.**—Finding that estimates run higher than was expected on proposed construction of sewage disposal plant on Hoop farm across river from Coshocton, engineering firm of Chester & Fleming, of Pittsburg, states that new estimates will be made on site on east side of river. State authorities require that tanks, sludge beds, etc., of disposal plant shall be embarked above high water mark of 1913. Estimates for both sides of river will be submitted in a few days.

**Kent, O.**—Kent has voted to issue \$90,000 worth of bonds to pay portion of sanitary sewer system's cost.

**Marion, O.**—Ordinance to proceed with construction of sanitary and storm-water sewer in first alley east of State St. and on Short St. to Park St. sewer has been adopted. Ordinance to construct sanitary and storm-water sewer on Uncapher Ave., from Bellefontaine Ave. to the Columbia St. ditch, has also been adopted.

**Youngstown, O.**—Resolution has been adopted for sewerage of Judson St.

**Erie, Pa.**—Ordinance has been adopted providing for construction of 12-in. diameter lateral sanitary sewer in Wood Rd., in the City of Erie, Pa., extending from 30th St. south to City Line, together with necessary house connections. M. J. Henry is City Clerk.

**Erie, Pa.**—Two ordinances for sewers have been passed finally. They are for 9-in. lateral sanitary sewer in Reed St. from 21st St. south 200 ft. and a 9-in. sewer in Wallace St. from 21st St. south 200 ft.

**Johnstown, Pa.**—The screening method of taking care of Johnstown sewerage is being discussed. Estimated cost, \$125,000.

**Johnstown, Pa.**—H. H. Grazier, Superintendent of Streets and Public Improvements, has recommended that as soon as possible under the law, a special election be held for voting on \$1,100,000 bond issue for construction of sanitary sewer system and sewage disposal plant.

**Lebanon, Pa.**—Council has decided to construct new sewer system.

**Philadelphia, Pa.**—In a few days Chief Webster will be ready to advertise his sewer work contemplated by new loan. The first big contract will be the Gunner's Run extension of big sewer in Indiana Ave., from Third to 12th St., for which \$200,000 is available. Plans are likewise ready for main sewer work to value of \$200,000 and \$250,000 for branch sewers. Director Taylor is ready to advertise for bids for relocation of sewers in central section of city to be affected by loop for proposed subway system, for which \$500,000 is provided.

**Williamsport, Pa.**—City Council has approved of ordinance for extension and completion of Maynard Alley and Washington St. storm water sewers.

**Dallas, Tex.**—Sanitary sewer bonds in sum of \$50,000 will be advertised for sale.

**Fort Worth, Tex.**—Water Commissioner Blanke's estimate for 1915 city budget has been completed. He asks \$9,344 for sewer maintenance and \$12,000 for sewer extensions.

**Houston, Tex.**—See "Miscellaneous." **Racine, Wis.**—That city will be able to save \$2,000 or more by readvertising for bids for trunk sewer which it is proposed to put in 21st St. is opinion of Alderman Charles Jensen. Lowest bid for 21st St. sewer was that of E. R. Harding & Co. The bid called for an outlay of \$86,822.11.

**Superior, Wis.**—Resolution has been passed authorizing construction of main sewer on Winter St. at gas plant. The Winter St. job will be biggest sewer job this winter and will give employment to number of idle men. Sewer will cost approximately \$10,000.

**Superior, Wis.**—City Commission has formally rejected bids on sewer work and instructed Board of Public Works to start construction of sewer between Catlin and Fisher Aves. and Broadway and 14th Sts. by day labor. It is expected that city will authorize construction of main sewer, costing approximately \$10,000, on Winter St. in vicinity of gas plant.

**Ningara Falls, Ont., Can.**—City Council has decided to undertake construction of several sewers, most of them petitioned for last year.

#### CONTRACTS AWARDED.

**Titusville, Fla.**—By city, to Benj. Akerman, Titusville, at \$600, for 385 ft. terra-cotta storm sewer.

**Springfield, Ill.**—For construction of 18-in. sewer in 1st St., to R. F. Egan, at bid of 69 cts. per lin. ft. for sewer, 34 cts. per lin. ft. for inlets, and \$22 each for manholes.

**Fort Wayne, Ind.**—Board of Works has awarded contract for construction of big main sewer in southeastern portion of city to S. G. Sheets Co., of South Bend, Ind. There were but two bids submitted, the only other coming from C. E. Moellering Construction Co. Engineer's estimate for work was \$39,215.28, with Sheets bidding \$38,530.80 and Moellering Co. \$38,881.08. The Moellering Co. was given two local sewers—one in alley south of Pontiac at \$1.13 a lin. ft. and other in alley between Reed and Winter at \$1.12 a lin. ft. Anton Rieg was given two jobs—one east of St. Mary's Ave. at 65 cts. a ft. and other in alley west of Hanna St. at \$1.20 a lin. ft.

**Indianapolis, Ind.**—Bids have been opened by Board of Public Works for construction of Warman Ave. main sewer. The Sheehan Construction Co. submitted lowest bid, \$7.73 a lin. ft. and will get the contract. The sewer is to be 14,813 ft. long. The other bidders were the American Construction Co., Indianapolis; John H. Cahill, Louisville, and William Jones, Pittsburgh. The successful bidder is an Indianapolis concern. Low bid is under the estimate of \$122,000.

**Indianapolis, Ind.**—Board has awarded contract to Sheehan Construction Co. for construction of Warman Ave. main sewer at \$7.73 a lin. ft. Contract aggregates about \$115,000.

**Keota, Ia.**—To C. E. Hughes, Armory Bldg., Rockford, Ill., contracts for 16,000 ft. 12-in., 5,630 ft. 10-in., 19,500 ft. 8-in. sewers, 43 manholes and 19 flush tanks.

**Baltimore, Md.**—Following are bids on Sanitary Contract No. 141, covering lateral sewers in District No. 5B: B. F. Sweeten & Sons, \$63,825.45; M. O'Herron & Sons, \$66,862.80; Slack & Slack, \$68,333.95; Carozza Bros. & Co., \$68,718.65; P. A. Rose, \$69,262.70; Albert J. Boyle, \$70,182.50; D. M. Andrews Co., \$72,046; Gallagher & Bryan, \$75,724.50; Ryan & Reilly Co., \$76,854.95; Jas. Ferry & Sons, \$78,524.25. Also bids on Sanitary Contract No. 142, covering Section 3 of the Jones Falls Interception: M. O'Herron & Sons, \$35,941.93; Slack & Slack, \$38,053.85; Ryan & Reilly, \$39,694.08; Jas. Ferry & Sons, \$43,132.05; Gallagher & Bryan, \$43,302.75. Contracts have been awarded in each case to lowest bidder. Calvin W. Hendrix is Chief Engr.

**Baltimore, Md.**—By city, for Sanitary Sewer Contract No. 143, to Smith & Ruggles, 3350 York Rd., Baltimore, at \$29,754.

**Hibbing, Minn.**—For constructing storm water and sanitary sewers in Alice addition to Butler & Coons Contracting Co., Hibbing.

**Carthage, Mo.**—The Plummer-Adams Co., of Springfield, was successful bidder for construction of proposed east side sewer, contract being let by City Council. This company's bid was \$17,352.76 for the completed sewer, using water-tight compound for the joints throughout. There were six bidders for this contract. Bids were based on speci-

fications which provided water-proof compound for joints only for 15-in. tile, extending from Central Ave. north, while rest of sewer would be supplied with cement joints. Bids on this basis were: J. A. Pringle, of Carthage, \$16,825.61; the Plummer-Adams Co., of Springfield, \$16,868.97; D. E. Koch, of Joplin, \$18,267.38; P. J. McNeerney, Carthage, \$18,370.12; Ozark Engineering & Construction Co., of Springfield, \$18,792.09; John Spandri, Springfield, \$19,044.41. R. N. Kirby is City Clerk.

**Newark, N. J.**—Another step toward completion of Passaic Valley trunk sewer has been taken when commissioners awarded two section contracts involving more than \$300,000. Contract for construction of Section No. 14, in Passaic, was given to Cenedella & Co., a construction firm of Milford, Conn. Company's bid was \$160,741, lowest among six bidders. Mason, Hilton & Co., of New York, were awarded job to construct Section No. 18, central, in Paterson, for \$158,450, lowest of six bidders. Work on both sections will be started immediately. Section No. 14, contract for which has been pending for three weeks, begins at Main and Gregory Aves., Passaic, and runs north to Washington Pl. and Hope Ave., 3,246 ft. It will be part open and part tunnel. Section No. 18, known as central portion of main intersecting sewer, is to start at 5th Ave., near East Railroad Ave., Paterson, and run south to the intersection of Wait and River Sts., a distance of 5,000 ft. It is to be all trench work.

**Paterson, N. J.**—For constructing Section 17, central portion of main intercepting sewer to New York & New Jersey Construction Co., 30 East 42d St., New York, at \$179,531.

**Cleveland, O.**—By Comrs. Purchases and Supplies for constructing sewer in East 93d St. outlet, from Carr Ave. N. E. to Lake Erie, to Walter P. Gibbons, at \$48,823.

**Marion, O.**—By county surveyor for Jones ditch improvement to Hoyle & Kohlberger at \$1,570. Contract for material was awarded to Akron Vitrified Clay Mfg. Co. of Akron, price being \$4,115. Improvement will consist of 5,025 ft. of 27-in. vitrified sewer pipe ditch.

**Piqua, O.**—For furnishing about 1,000 ft. of 12 and 15-in. vitrified pipe sewer, to Morrow & Licklider, of Piqua. Albert Schroeder is Director of Service.

**Wheeling, W. Va.**—Council has awarded contract for laying of sewer on Baird St. to Taylor Kellar.

**Superior, Wis.**—To Frosserom & Mattson, at \$1,075, for construction of sewer between Norwood and Maple Sts., from Gates to Raspberry Aves., in Central Park.

#### WATER SUPPLY

**Fayetteville, Ark.**—City Water Commissioners are anticipating installation of a filter or clarifying system to purify and cleanse the water. H. Sour is Supt. and Treasurer.

**Glenwood, Ark.**—Bond issue will be voted on for installation of new water works system.

**Gurdon, Ark.**—Plans have been prepared for installation of municipal water, sewer and electric light systems to cost \$102,000.

**Linda Vista, Cal.**—Survey has been completed for giving city water supply.

**Pasadena, Cal.**—In order to improve water distribution in northwestern section and to reduce expense of pumping Commissioner of Public Utilities M. H. Salisbury is planning important addition to municipal water system, details of which he has laid before his fellow-commissioners. Estimated cost of work is \$31,000. Commissioner plans to lay a 24-in. pipe from Windsor Ave. reservoir to Casitas Ave. and Atlanta St., a distance of 4,400 ft., the cost of which will be \$8,800. From there it is planned to put in 1,380 ft. of 24-in. cast iron pipe on Mountain St., running from Casitas Ave. to Lincoln Ave., at an expenditure of \$7,220. On Mountain St. from Lincoln Ave. to Raymond it is planned to lay 3,160 ft. of 20-in. cast iron pipe, the cost of which will be \$14,300 and \$1,000 is allowed for extra reservoir and pump connections, making the total of \$31,320.

**Sacramento, Cal.**—Bids for pipe to connect residences in suburbs with city water mains will be called for by Commissioner of Public Works Thomas Coulter.

**San Diego, Cal.**—Water Department will proceed with construction of Pine Creek diverting dam at estimated cost of \$705,000.

**Stamford, Conn.**—See "Miscellaneous." **Wilmington, Del.**—See "Miscellaneous."

**Seabreeze, Fla.**—Ordinance has been passed authorizing \$15,000 bond issue for water system.

**Atlanta, Ga.**—W. Zode Smith, Gen. Mgr. of water works, has recommended expenditure of \$500,000 for installation of two pumps for water works.

**Staunton, Ill.**—Proposition to issue \$20,000 worth of bonds with which to secure money to make permanent water supply of city of Staunton will be submitted to voters at special election to be held Jan. 19.

**Crawfordsville, Ind.**—Election has resulted in favor of issuing water bonds to amount of \$10,000.

**Earlham, Ind.**—Town Council has authorized issuance of water works bonds in sum of \$8,000.

**Burton, Kan.**—Proposition to issue \$20,000 in bonds for purpose of putting in modern waterworks here has been carried by large majority of citizens.

**Beverly, Mass.**—Additional water supply from Ipswich River will cost \$130,000.

**Lowell, Mass.**—Municipal Council has voted to borrow \$300,000 for water works department, \$225,000 of which will be used in construction of filtration plant at boulevard. Council has also voted to borrow \$40,000 for sewer construction.

**Salem, Mass.**—Water Commission has authorized Engineer W. S. Johnson to go ahead with tentative plans for additional water supply.

**Aurora, Minn.**—Election to authorize issuance of \$65,000 worth of bonds to be sold to state has been called by Village Council for Jan. 27. Bonds will be in two issues. One issue is for \$25,000 for water development and extensions. There are a number of improvements needed for water department of village and water mains on Jackson St. are desired to be laid in alleys. It is estimated that \$25,000 will be required to care for this work of laying mains in the alleys and making extensions.

**St. Paul, Minn.**—Allen Hazen, water engineer of New York City, will make a complete survey of water situation in St. Paul at fee not to exceed \$5,000. Formal agreement providing for this work will be approved by Water Board.

**Joplin, Mo.**—Prof. E. J. McCaustland, dean of engineering department of University of Missouri, will make preliminary survey of needs of city for municipal water works plant and will determine repairs necessary and equipment needed to increase efficiency of municipal light plant.

**Berlin, N. H.**—Installation of water system is planned.

**Perth Amboy, N. J.**—In view of the apparent need of water storage here and necessity of providing work for some of unemployed men here, Chairman Chris. Jorgensen, of committee on streets and sewers of Board of Aldermen, suggests that large reservoir be erected on original reservoir site in northwestern part of city.

**Elmsford, N. Y.**—Board of trustees of Elmsford have voted to submit to taxpayers at spring election proposition calling for appropriation of \$35,000 for establishment of water system in village, water to be taken from Catskill Aqueduct, owned by City of New York, which runs through that village. Plans for work have been made by Wulff Engineering Co. of Tarrytown. Principal streets of village will be supplied with 10-in. mains and four 6-in. mains in side streets. Water will be supplied from a stand-pipe which will be erected near Knollwood Country Club, at elevation of over 400 ft. from village's lowest point near the Putnam Railroad station.

**Middletown, N. Y.**—Specifications have been issued for contract to transport piping for 20-in. water main from Highland Lake to city filter plant. Transportation route will be from State Hospital switch to line of piping system. Bids for this contract will be opened in short time, and specifications may be seen at office of Commissioner of Public Safety Deegan.

**Port Henry, N. Y.**—Citizens are planning to spend \$12,000 for enlargement of water system. A. C. Linden is Clerk Board of Trustees.

**Saratoga Springs, N. Y.**—At meeting of Board of Trustees of Saratoga Springs a resolution was adopted favoring installation of filtration plant for village water system.

**Yonkers, N. Y.**—Ordinance has been adopted for extension of water works

system by placing of water main in 24st St., between McLean Ave. and the city line.

**Yonkers, N. Y.**—Ordinance has been adopted directing the Board of Contract and Supply to take steps to advertise for proposals for furnishing new engine and generator in tube well station.

**Hamilton, O.**—Ordinance has been passed providing for issuing of \$10,000 of bonds, for purpose of constructing new wells and making and installing the necessary connections and intake lines for improvement of city water works system.

**Toledo, O.**—Plans and specifications for another water main across bed of Maumee River have been prepared. This work has been completed by G. A. Gessner, superintendent of the water works, and submitted to Service Director Boardman. Main will connect new East Side 24-in. mains with Broadway pumping station and relieve short water supply on East Side. Main will be more than half a mile long—2,713 ft.—and will be of 24-in. pipe. Line will extend north of Corbett Island, striking river bank on Toledo side at Bacon St.

**Toledo, O.**—Plans for high pressure pumping station have been gone over thoroughly by service department officials, and several minor changes will be made.

**Wooster, O.**—City Council has authorized issuance of water supply and filtration plant bonds in sum of \$125,000.

**Quinton, Okla.**—Quinton will soon vote on water works proposition. The Alexander Engineering Co. of Oklahoma City proposes to make surveys, plans and specifications and supervise the construction work. If contract is accepted by vote of people company will get for their services two per cent. when bonds are approved by attorney general and sold and three per cent. as work progresses.

**Lancaster, Pa.**—Mayor McClain has recommended loan of \$145,000 for improvements and purchase of new equipment for water department.

**Philadelphia, Pa.**—By advertising for bids for construction of new sedimentation basin for Torresdale filters and for delivery and laying of 48-in. pipe for new general service water main in West Philadelphia, Director Cooke is preparing to get under way this improvement to water system as soon as weather conditions will permit. Bids are to be opened on Feb. 9. Chief Davis, of Water Bureau, has his plans all ready and when contract is awarded will start work at Torresdale. City owns sufficient ground there to accommodate the new sedimentation basin, which will be 200x500 ft. and have storage capacity for 100,000,000 gallons. This work will be rushed so as to relieve the Torresdale filters, which are being pressed daily to their normal capacity. The basin will cost about \$400,000, the amount provided by the \$11,300,000 loan. For West Philadelphia system bids are being asked for furnishing of pipe, which will be one contract, and a second contract for the laying of the same. There is available for pipe, work of putting the pipe in ground and for fittings and valves \$150,000. Plan at present is to start work on this new 48-in. main in 53d St., between Market St. and Girard Ave.

**Lynchburg, Va.**—Common Council has set aside veto of Mayor Jester of resolution providing for purchase of new pump for city water works for emergency uses. Appropriation carried by resolution is \$22,000. Veto now goes to Board of Aldermen.

**Norfolk, Va.**—In recommendation of Engineer T. E. Dornin, in charge of water department, the various city departments to which water from municipal plant is furnished will be metered during next few weeks at total cost of \$4,271. This work was provided for in \$75,000 appropriated for purchase of water meters.

**Richmond, Va.**—The Administrative Board has been presented petition by citizens of Oak Grove, to which more than 200 signatures were attached, in which board is asked to provide means whereby suburb may be furnished with city water.

**Shadyside, W. Va.**—This village south of Bellair, will hold special election on Feb. 9, when citizens will be given an opportunity to vote on proposition of bonding village for \$45,000 for municipal water works system.

**Seattle, Wash.**—Bids on contract for laying water mains in Third Ave. Northwest have been rejected by Board of Public Works, and secretary instructed to call for new proposals.

## CONTRACTS AWARDED.

**Seabreeze, Fla.**—For constructing water works as follows: To American C. I. Pipe Co., Birmingham, Ala., 6-in. pipe, \$23.10 per ton and 8-in., \$22.60, and castings, \$55 per ton; to F. S. Berham, Jacksonville, for hydrants and valves and also laying pipe; and to Cameron & Barkley, Jacksonville, for furnishing the T's. Engineer is C. M. Rogers, Daytona.

**Mishawaka, Ind.**—By Board of Public Works for installing new pumping engine at east end pumping station to Prescott Pump Co. of Milwaukee, Wis., at \$12,035.

**South Bend, Ind.**—For c. i. water pipe and specials for use water works for year 1915 to Lynchburg Foundry Co., Lynchburg, Va., at \$21.70 per ton for pipe and 2½ cts. per lb. for specials.

**Louisville, Ky.**—Board of Public Works has opened bids for 31 fire hydrants at various points throughout city. That of E. S. Larson offers to install hydrants for upward of \$114, according to location, soil, etc., and is regarded as probably the lowest.

**Plaquemine, La.**—By city, to Bash & James, Kansas City, Mo., at \$35,790, for water works construction. C. A. Rees is engineer, Shreveport, La.

**St. Paul, Minn.**—To Henry R. Worthington, New York City, contract from city purchasing committee for the following meters: 2,500 ¾-in., 300 ¾-in., and 85 2-in.

**Carthage, N. Y.**—To John Thompson, city, for furnishing and laying about 3,300 ft. of water pipe and two hydrants for London Wallock's farm on Alexandria Road.

**New York, N. Y.**—For dismantling and transporting pumping engine from Baldwin station to 179th St. station to Christopher Nally, 710 Columbus Ave., New York, at \$6,875.

**Cincinnati, O.**—For laying 36-in. water mains on Tennessee Ave. to J. J. Brown, 72 Ash Ludlow, at \$8,601.06. For mains on Madison Rd. to M. J. McCarthy, 2538 Woodburn Ave., W. H., at \$9,159.75, and on Brotherton Rd. to T. P. Strack, 31 Goodall Bldg., at \$15,748.

**Cleveland, O.**—For turbine-driven centrifugal pumps for Division St. filtration plant to Dravo-Doyle Co., Philadelphia, Pa., at \$125,000.

**Turner, Ore.**—For installation of water works system to Dennis Construction Co., Portland, Ore., at \$12,000.

**Big Spring, Tex.**—By city to E. L. Dalton, of Dallas, to lay about \$25,000 ft. water mains.

**Corpus Christi, Tex.**—Lewis Lock, of Monroe, La., is lowest bidder for city waterworks improvements. Total of bids as follows: Howard Construction Co., Cameron, Tex.—Cast iron pipe, \$300,170.44; steel pipe, \$279,954.40; wood pipe, \$232,206. Gordon & Taylor Const. Co., Denver, Col.—Steel pipe, \$279,832.40; wood pipe, \$252,577.40. Tankawa Const. Co., Kansas City, Mo.—Cast iron pipe, \$326,776.32; steel pipe, \$283,284.52. Foley Const. Co., Chicago, Ill.—Steel pipe, \$249,566.84. Commercial Const. Co., Kansas City, Mo.—Steel pipe, \$269,508. Sherman Machine and Iron Works, Oklahoma City, Okla.—Cast iron pipe, \$306,167.19; steel pipe, \$258,670.35; wrought steel pipe, \$261,852.91; wood pipe, \$243,553.19. The Sykes Co., Minneapolis, Minn.—Cast iron pipe, \$319,629.58; steel pipe, \$275,918.74; wood pipe, \$282,283.86. Louis Lock, Monroe, La.—Cast iron pipe, \$286,211.10; steel pipe, \$259,454.58; wood pipe, \$239,607.58.

**Orillia, Ont.**—To International Filter Co., Chicago, Ill., contract for installation of water filtration plant, 2,000,000 gal. capacity per day.

## LIGHTING AND POWER

**Phoenix, Ariz.**—Central Ave. to city limits is soon to be illuminated from ornamental lighting standards. A new type of standard has been designed under direction of city manager which is so constructed as to be interchangeable. A single globe with large lamp occupies the uppermost portion of the standard.

**Pacific Grove, Cal.**—Pacific Grove in very short time will have entirely new street-lighting system and additional fire hydrants, which have been greatly needed by city to facilitate work of local firemen in case of fires in certain parts of town.

**Pasadena, Cal.**—Petition for ornamental lights on Marengo Ave., from Colo-

rado St. to Washington St., has been granted.

**Pacific Grove, Cal.**—Arrangements have been made with the Coast Counties Gas & Electric Co. for new lighting of Pacific Grove. New incandescents of 100 candle power will take place of the present arc system, the lights, some 90 in number, to be placed at intersection of streets throughout city, illuminating by as even distribution as possible many ways now dark. Work of installing these new lights will begin right away.

**San Francisco, Cal.**—Van Ness Ave. will be the great white way, as far as street lighting goes, when new system of lamps ordered by Board of Supervisors is in operation. Two high candle-power tungsten lamps on each trolley pole is order to Pacific Gas & Electric Co., and there are 8 trolley poles in each of the 31 blocks between Market St. and the bay.

**Washington, D. C.**—An American consular officer reports that a royal decree has been published authorizing the purchase of four electric cranes for use in port of Valencia, Spain. Plans and specifications are on file in the office of the Secretaria de la Junta de Obras del Puerto de Valencia, Valencia, and in office of the Ministerio de Fomento, Sección de Puetos, Madrid. A list of persons who are in a position to represent American firms may be obtained on application to the Bureau of Foreign and Domestic Commerce or its branch offices. No. 15, 182, Bureau of Manufactures.

**Gainesville, Fla.**—City Council has ordered light committee to institute investigation relative to probable cost to build modern gas plant, to be owned by municipality, and committee are to report at earliest date possible.

**Danville, Ky.**—Installation of ornamental lighting system on Lexington Ave. is being discussed.

**New Albany, Ky.**—New Albany Board of Public Works has adopted new specifications for electric light fixtures for City Hall that is being remodeled, and will ask for new bids on fixtures.

**Lake Charles, La.**—City will advertise gas franchise in a few days. G. L. Riling is Mayor.

**Baltimore, Md.**—Plans for continuation of white way lights on North Howard St. have been completed by Department of Lamps and Lighting and within short time actual work of installing new standards will be started. New lights will extend from Centre St. to Cathedral, connecting up white way system at Mount Royal Ave., thus forming final section of circle that will extend from business section on Howard St. and eastern section by way of Fallsway. About 30 lamps similar to those on Baltimore and other downtown streets will be installed, all of which will be lighted by means of underground wires.

**Fitchburg, Mass.**—Installation of new nitrogen tungsten lamps on Monument Square and through business section is being considered, providing merchants will cooperate.

**Salem, Mass.**—Better street lighting is being planned.

**Cadillac, Mich.**—Lighting of principal business street with boulevard lighting system is being urged.

**St. Paul, Minn.**—Bids for nitrogen-filled lamps have been placed before Council by Councilman Keller. Purchasing Agent Hohenstein said that low bidder appeared to be the Sterling Electric Co., which guarantees life of lamp for 1,350 hours and adds commercial discounts, amounting to 17 per cent, for \$150 worth of goods, and 37 per cent for order of \$150,000 worth within the year. City may get a discount of 25 per cent or more. Several of companies gave list prices in their bids. For the 250-candle power 6.6 ampere lamp the bid was \$2.35; for the 400-candle power lamp, \$4, and for 1,000-candle power, \$6.50. Discounts will apply to these prices. Bids probably will not be passed upon until return of V. H. Roehrich, director of city testing laboratories.

**St. Paul, Minn.**—Councilman Keller, commissioner of public utilities, has recommended to purchasing committee that it buy from St. Paul Gas Light Co. 100 nitrogen-filled lamps, 400-candle power, at \$4.15, with discount of 33 per cent. These lamps are guaranteed for average service of 1,350 hours. Mr. Keller also recommended purchase of 100 fixtures from the St. Paul Electric Co.

**St. Paul, Neb.**—City Council has passed ordinance calling special election for Feb. 9th, to vote upon question of issuing \$23,000 in bonds for purpose of building municipal city lighting plant.

**Camden, N. J.**—One of latest propositions of Board of Trade for improvement of Camden will be considered by council at next meeting, when lighting committee will be urged to have established on busy thoroughfares a "white way." Members of board believe that Market and Federal Sts., Broadway and Kaighn Ave. can be brilliantly illuminated at cost not exceeding \$2,000.

**Bath, N. Y.**—Location of lamps for lighting village streets as now being laid out by Charles Larrows, the engineer in charge of construction of municipal lighting plant, calls for 200 lamps, where about 80 are now employed. It is designed to have boulevard lights every 60 ft. in East Steuben, Liberty and Washington Sts. The new lighting plant will be ready for work by May 1.

**Port Chester, N. Y.**—Board of Trustees has decided to establish an ornamental lighting district in North and South Main Sts. Plans call for installation of 67 standards carrying four lamps each.

**Yonkers, N. Y.**—Ordinance has been adopted directing the erection of ornamental light standards on McLean Ave., from Kimball Ave. to the Bronx River Rd.

**Cleveland, O.**—City will install 550 new ornamental street lamps in near future.

**Mansfield, O.**—Legislation is in progress for new lighting system and bids will no doubt be received about April 1.

**Mr. Vernon, O.**—City Council has voted to appoint committee to investigate advisability of placing cluster lights around public square.

**Connellsville, Pa.**—A "great white way" is to be installed along Pittsburg St.

**Harrisburg, Pa.**—Preparatory to establishing comprehensive lighting system for whole of Capitol Park, including extension area, Superintendent of Public Grounds and Buildings Rambo has let contract for 30 nitrogen gas Mazda lamps, of 500 watts, to be placed in present capitol grounds.

**Union Deposit, Pa.**—Installation of electric street-lighting system is being considered.

**Trent, S. D.**—At special election held by vote of 39 to 1, a twenty-five year franchise was granted to Flandreau Light and Power Co. to furnish electric lights for town of Trent. It is understood that everything will be in readiness for lights to be turned on by July 1, 1915.

**Seattle, Wash.**—Council has Passed, over Mayor's veto, ordinance appropriating sum of ten thousand dollars to be used in making extension of city's lighting system outside city limits, to and in vicinity of Foster, Tukwila and other points in Duwamish Valley.

## CONTRACTS AWARDED.

**Lapeer, Mich.**—Board of Supervisors has decided to accept sealed bid of Lapeer Gas & Electric Co. to furnish lights for the court house, county buildings and jail for current year.

**Allentown, Pa.**—Contract for electrical installation (except fixtures) for rear wing of new Lehigh Co. court house has been awarded to Commercial Construction Co., of New York, N. Y. R. S. Rathen is supervising engineer.

**Pittsburgh, Pa.**—Councilman Committee on Public Works has affirmed ordinance for new contracts for electric current to be furnished the city. First authorized a three-year contract for electric current for activities now furnished by Duquesne Light Co. and second is for five-year contract for current for Northside street lighting system and for certain municipal buildings. The latter contract will do away with the Northside light plant, owned by city. The Committee on Public Service and Surveys affirmed ordinance amending franchise ordinance of the Pennsylvania Light, Heat & Power Co., changing the city's remuneration from 2½ per cent of gross receipts to \$5,000 a year.

**Corpus Christi, Tex.**—County Commissioners' Court has granted to Corpus Christi Gas Co. a franchise to extend its gas mains from Corpus Christi, along highways, roads, streets and other public places of Nueces County, for purpose of distributing and selling gas.

## FIRE EQUIPMENT

**Phoenix, Ariz.**—Manager Farish expects within short time to advertise for bids for purchase of additional fire apparatus. This will include modern Graham high pressure auto fire pump and

aerial truck. Former he expects will cost in neighborhood of \$9,000 and latter approximately \$12,000. He has available from bond issue voted several months ago for fire improvement purposes approximately \$45,000.

**Pasadena, Cal.**—Bids for furnishing two auto pumping engines, each of 700 gallons pumping capacity, have been opened by city commission and referred to Commissioner W. B. Dougherty. Gorham Fire Apparatus Company, two Seagrave model T water-cooled 750-gallon combination pumping engines and hose cars, \$10,000 each, less \$500 if awarded the contract for both. American-La France Fire Engine Company of California, \$9,350 for a 750-gallon combination and \$9,850 for 1,000 gallons. James Boyd Fire Apparatus Co., \$8,900 for one or \$17,500 for two.

**Pomona, Cal.**—New bids have been called for purchase of automobile chemical engine.

**San Jose, Cal.**—Because of technical defect in advertisement, which it was feared would have some bearing on legality of proceedings, bids which were to have been opened for furnishing motor vehicles to police and fire departments have been ordered returned to bidders unopened and secretary has been instructed to advertise anew. City intends to purchase on installments five or less one and one-half-ton motor trucks for the fire department and one automobile for the police department.

**Fairfield, Conn.**—If present plans of Fairfield Fire Department No. 1 materialize, Fairfield Center will have a fire fighting organization that will equal any in any village of its size in efficiency. The company plans to purchase an automobile chassis, which will be properly equipped and used as extra piece of apparatus. The machine will be used for carrying hose and extra chemical tanks and charges.

**Suffield, Conn.**—Purchase of new fire equipment will be discussed.

**Stamford, Conn.**—See "Miscellaneous."

**Delaware City, Del.**—About 700 ft. of hose and hose case will be purchased by Delaware City Volunteer Fire Co.

**Pensacola, Fla.**—One thousand feet of hose, guaranteed for not less than three years, will shortly be bought by city commissioners. Bids are now being asked.

**Canton, Ill.**—Fire Marshall C. H. Totten has recommended that fire alarm system of 10 to 25 boxes be installed in business district, and has said that about May 1st 500 ft. of 2½-in. fire hose and 200 ft. of 1-in. chemical hose will be needed.

**South Bend, Ind.**—Purchase of aerial truck and pumping engine for fire department has been recommended by Fire Chief Irving W. Sibell.

**Fulton, In.**—Town is considering question of issuing fire department bonds in sum of \$10,000.

**Lexington, Ky.**—Automatic fire sprinklers are recommended for hospitals, asylums and hotels.

**Paducah, Ky.**—City commissioners are thinking seriously of installing motor trucks in each of city's fire stations in order to eliminate horses and make department more efficient.

**Beverly, Mass.**—In his annual report, City Electrician William A. Greenlaw, who has charge of entire fire alarm system of city, recommends installing of compressed air fire whistle to take place of present steam whistle. A compressed air fire whistle could be purchased for \$2,000.

**Lowell, Mass.**—A very substantial appropriation for more motorized fire apparatus will be asked for by Commissioner Carmichael in his fire department estimate for 1915.

**Milford, Mass.**—Motorizing of fire apparatus is being considered.

**Peabody, Mass.**—Motor apparatus for Hose Two will be asked for this year.

**Meridian, Miss.**—Chief J. J. Powell has recommended purchase of chief's automobile, to be equipped with fire fighting apparatus.

**Garfield, N. J.**—J. A. Forss, Chief of Police, has recommended police and fire signal alarm system.

**Long Branch, N. J.**—Commissioner of Public Safety T. V. Arrowsmith urges purchase of auto fire apparatus and new fire house and alarm system.

**New Brunswick, N. J.**—Sum of \$2,000 is asked for purchase of new hose.

**Niagara Falls, N. Y.**—Fire Chief Utz, in his annual report to Fire Board, has recommended two new fire halls be built, one in vicinity of East Falls St. and Portage Rd., and other on lot owned by city at 45th St. and Willow Ave., and both equipped with motor apparatus.

**Niagara Falls, N. Y.**—At a meeting of the fire, water and light committee yesterday afternoon it was decided to purchase about 1,500 ft. of hose. It was also decided to ask for bids for construction of new hose wagon. Committee will borrow a hose wagon from the Ontario Power Co. while new truck is being constructed. New hose wagon will cost about \$500.

**Schenectady, N. Y.**—Bond issues have been authorized for \$5,000 and \$7,500 for purchase of new auto fire apparatus for No. 4 and No. 6 Stations.

**Schenectady, N. Y.**—Commissioner of Safety Wemple is considering request to Common Council that provision be made for tractor for gasoline engine at No. 9 fire station on Brandywine Ave.

**Yonkers, N. Y.**—Bids received for 3,000 feet of hose have been rejected, and new specifications will be drawn.

**Watertown, N. Y.**—Fire Chief Bundy has recommended the following improvements: A new building to replace the Curtis St. engine house. A new site for this is desired. A new floor in the Factory St. house. Also that the house be painted. The purchase of a combination chemical and hose wagon, motor or horse driven. The purchase of a new automobile for the chief. The purchase of six nozzles of the improved type. The purchase of three chemical tanks. Concrete platforms along Black river for pumping stations for fire engines.

**Canton, O.**—Bids will shortly be called for motor triple combination pump, chemical and hose wagon. R. J. Kunkel is Director Public Safety.

**Mansfield, O.**—Mayor F. S. Marquis has recommended purchase of motor tractor for ladder wagon.

**Baker, Ore.**—City Commissioner Geo. Henry has announced that he is planning to have installed a new fire alarm system.

**Chester, Pa.**—The Franklin Fire Co. will motorize their apparatus.

**Franklin, Pa.**—Appropriation of \$2,000 has been provided for purchase of fire truck.

**Franklin, Pa.**—Marshall Dolby has recommended purchase of pulmotor for fire department, also new hook and ladder truck.

**Lancaster, Pa.**—Mayor McClain has recommended loan of \$20,000 for purchase of equipment for Fire Department.

**Old Forge, Pa.**—Purchase of motor apparatus, to cost approximately \$9,000, for Lawrence Hose Company, is being considered.

**Quakertown, Pa.**—Borough Council is planning for installation of new fire-alarm system.

**Williamsport, Pa.**—Council has approved of new motor chemical ordinance.

**Cranston, R. I.**—Mayor John W. Horton of Cranston has been instructed by City Council to appoint committee to consider matter of purchasing sufficient number of steam engines for protection of property in that city.

**Pascoag, R. I.**—Hose Company No. 1 of Pascoag is to have new chemical wagon to replace one now in service which will be sent to Hose 2. Additional rubber coats, boots and hats have been added to equipment of latter company.

**Temple, Tex.**—Installation of new fire-alarm system is being considered by City Council.

**Richmond, Va.**—Fire department has asked City Council for \$373,415.23 for maintenance of department during 1915. Of this sum \$66,499.60 is to be expended in recently acquired territory. Needs of annexed territory are itemized as follows:

Lot and house in South Richmond, \$9,600; lot and house for the West End, \$12,500; house for Highland Park, \$10,000; lot and house for Barton Heights, \$9,500; changes and additions in the central fire-alarm office to care for the annexed territory, \$9,000; for cable carrying wires from City Hall to proper distributing points, \$3,365; for alarm boxes and installation of signal service in Ginter Park and Barton Heights, \$4,214.90;

for installing in Highland Park alarm boxes and signal service, \$2,305.69; for extension of similar equipment in the western part of the city, \$1,306.58; for installation of similar equipment in the eastern part of the city, \$1,306.58; for extension of equipment in the South Side, \$1,691.82, and for extra labor necessary for all this work is \$1,809.03.

**Salem, W. Va.**—Installation of alarm system is being discussed.

**Puyallup, Wash.**—Fire department equipment bonds in sum of \$5,000 have been sold to Hanchett Bond Co. of Chicago.

#### CONTRACTS AWARDED.

**Florence, Ala.**—To American-La France Fire Engine Co., Inc., Elmira, N. Y., for motor combination chemical and hose car.

**Washington, D. C.**—To Front Drive Motor Co., Hoboken, N. J., for two gasoline line motor driven tractors, at \$6,700.

**Washington, D. C.**—To Gamewell Fire Alarm Telegraph Co., New York office, for furnishing ten alarm boxes, at \$750.

**Newport News, Va.**—Bid of Seagrave Fire Engine Co., Columbus, O., on motor apparatus for fire department, has been accepted; cost, \$11,935.

**Tacoma, Wash.**—Council has voted to enter into contract with Foss Launch Co. for fireboat to be at demand of fire department on rental basis. Boat will cost city \$2,993 a year, and company guarantees to reach any waterfront fire in six minutes. Boat is guaranteed to have capacity to pump 1,000 gallons of water a minute.

#### BRIDGES

**Wilmington, Del.**—A committee from Ninth Ward Civic Association has called upon Levy Court to urge necessity of building new bridge across Brandywine at Washington St. to replace present structure which, they claimed, is unsafe.

**Jacksonville, Fla.**—Councilman Callahan has requested committee to recommend to city council that bridge be built over Hogans Creek at Liberty and Orange Sts. This bridge will cost about \$20,000. It has been decided to rebuild the bridge over Deer Creek.

**Indianapolis, Ind.**—Requests for additional appropriations for 1914 and for reappropriations for 1915, aggregating more than \$500,000, will be considered by Marion county council. Total amount asked is \$530,953.32. For West Washington St. bridge over White River, a reappropriation of \$311,960.56 is asked for West New York St. bridge over White river, a reappropriation of \$150,000 is asked. Small reappropriations for bridge repairs are also asked. Of miscellaneous requests, largest is that for track elevation, \$32,063.99.

**Cumberland, Md.**—Finished plans for a reinforced concrete and granite arch bridge to replace old Valley Falls bridge between Cumberland and Central Falls have been accepted by bridge commission. Plans call for bridge 220 ft. long, exclusive of approaches, with three spans. Each end span will be 62 ft. long and middle one 65 ft.

**Boston, Mass.**—Permission has been granted by street commissioners for building of bridge across Avon St. connecting two retail units of business of Jordan Marsh Co., as petitioned for by company some weeks ago.

**Greenfield, Mass.**—Plans for proposed bridge across Green River have been completed. Estimated cost \$6,500.

**Grand Haven, Mich.**—Construction of bridge across Grand River at Eastmanville is being discussed. Cost, about \$50,000.

**Grand Rapids, Mich.**—Members of Central West Improvement Association are favoring building of new concrete bridge over Grand River at Pearl St.

**Paterson, N. J.**—Plans are being considered for new bridge in West Paterson. Estimated cost, \$50,000.

**Plainfield, N. J.**—Agitation has been started again for new bridge over Greenbrook at Grove St., present wooden structures being inadequate and badly in need of repair.

**Niagara Falls, N. Y.**—Works Board has asked council to approve expenditure of \$600 to employ engineer at \$100 a month to draw plans for new concrete bridge to replace present 2d St. bridge.

**Rochester, N. Y.**—Ordinance has been adopted for repairing Driving Park Ave. bridge at estimated cost of \$17,000.

**Cincinnati, O.**—Ordinance has been passed providing for issue of bonds in sum of \$50,000 for purpose of constructing and repairing viaducts, bridges and culverts.

**Cincinnati, O.**—Bond issue of \$2,500,000 for reconstruction of Southern Bridge over the Ohio is urged.

**Philadelphia, Pa.**—Movement has been started for bridge over Delaware from this city to Camden, N. J.

**Clinton, Tenn.**—Three steel bridges across Clinch river, \$40,000 in bonds for additional pikes and new school houses is progressive step that has been taken by Anderson county quarterly court.

**Lynchburg, Va.**—Lynchburg City Council will ask special session of Legislature to enact enabling act under which proposed \$300,000 concrete viaduct can be erected over James River to Amherst County. Viaduct is to be erected for

three railways. Bridge is designed to cost about \$300,000, and will eliminate half a dozen grade crossings near Union Station.

**Chehalis, Wash.**—Plans have been prepared by County Engineer John S. Ward for new steel bridge across Cowlitz River, at Mayfield. Span is 200 ft. in length and floor of proposed structure is figured at approximately 100 ft. above water level.

#### CONTRACTS AWARDED.

**Roscoe, Ill.**—To W. C. Kiernan, White-water, Wis., at \$1,488, for construction of reinforced concrete bridge, 45-ft. span, 16-ft. roadway, 124.1 cu. yds. of concrete, 17,755 lbs. of reinforcing steel.

**Laporte, Ind.**—County commissioners have let contracts for building of 13 bridges in LaPorte county, contracts aggregating \$22,068. Contracts for superstructure of 11 bridges went to Rochester Bridge Co. and their contracts amount to \$8,821. On two of bridges contracts for arches only were let. William A. Steigely received contracts for arches of ten of bridges, his contracts amounting to \$10,147. H. A. Wilhelm received contracts for arches of three of bridges and his contracts amount to \$3,110. Bridges, on which contracts were let, are known as Griege bridge, the Tuesberg bridge, the Selby, Price, Dell, Sheldon, Hart, Bankson (arch only), Dahl (arch only), Scott, Brandeis, Britten and Schmidt.

**Lake Charles, La.**—The police jury has entered into private contract with Harrison and Baum Bridge Co., of Memphis, Tenn., for construction of all concrete and wooden bridges and culverts on highways west of river. Contract price for work is \$40,404.25, and operations will be commenced as soon as possible.

**Greenville, Miss.**—To the W. T. Young Bridge Co. of Nashville, Tenn., at \$8,928, for construction of eighteen steel bridges of from 32 to 70-ft. span in Bogalusa Drainage District. Morgan Engineering Co., Memphis, Tenn., are engineers.

**Atlantic City, N. J.**—By Board of Chosen Freeholders of Atlantic County for construction of 386-ft. bridge over Hospitality Creek on Somers Point-Longport Blvd., to Edward Fay & Son, at \$25,000. A. H. Nelson, 636 Guarantee Trust Bldg., Atlantic City, is County Engineer.

**Pittsburgh, Pa.**—For building steel superstructure for Sylvan Ave. bridge to McClintic Marshall Co., Pittsburgh, at \$44,725. Robt. Swan is Dir. Dept. Pub. Wks.

**Memphis, Tenn.**—For constructing underpass at Auction Ave. and North Memphis levee to Noll Construction Co., Chattanooga, at \$5,373.

**Gate City, Va.**—To Camden Iron Co., Salem, Va., at \$1,689, for construction of bridge over Big Moccasin Creek. Plans prepared by State Highway Commissioners, Richmond, call for 87½-ft. steel span with concrete substructure.

**Richmond, Va.**—By Circuit Court of Henrico County for construction of reinforced concrete bridge over Chickahominy River between Hanover and Henrico Counties, to Berkeley & Schmidt, Richmond, Va.

**Seattle, Wash.**—Bids have been opened as per advertised call for construction of Buckley bridge to McCreary & Willard at \$1,850, they being lowest and best bidders. Bids were also opened for construction of approach to Buckley bridge and contract was awarded to Weymouth Construction Co. at \$3,996.22.

**Tacoma, Wash.**—McCreary & Willard, of Spokane, have been awarded contract to erect steel for inter-county river bridge at Buckley. Their bid was lowest of 10 submitted and they received contract at \$3,526.59. Estimate of the King county engineer for work was \$6,929.95.

**Viroqua, Wis.**—By County Highway Commissioner of Vernon County for construction of a 120-ft. steel bridge over Kickapoo River near Seeleysburg, to Worden-Allen Co., Milwaukee, at \$4,874.

#### MISCELLANEOUS

**Nicolaus, Cal.**—Saturday, Jan 30, has been fixed as date for bond election called by trustees of Reclamation District No. 1001 for purpose of voting on proposition of issuing bonds of said district in sum of \$500,000. Money is to be used in completing big drainage and reclamation works of district.

**San Jose, Cal.**—See "Fire Equipment."

**Bridgeport, Conn.**—Bonds in sum of \$30,000 will be sold to get funds for work in connection with new almshouse.

**Bridgeport, Conn.**—Appropriation of \$50,000 is urged for comfort stations.

**Stamford, Conn.**—Following special appropriations have been made: Fire hydrants, \$500; furnishings for new fire

station, \$1,000; installation and repairs of hydrants, \$1,500; water for hydrants, \$3,856; motor work-car, \$500; hose, \$1,500; motor aerial truck, \$10,000; bicycle (Police Dept.), 60; motorcycle (Police Dept.), \$250; automobile, \$1,400; East Ave sewer, \$639.43; Mission St. sewer, \$155; Ridge Pl. sewer, \$302.50; Shippan Ave. storm water, \$6,000; Smith St. and Stillwater Ave. storm water, from Mill River to Virgil St., \$5,516.50; Stillwater Ave. storm water, from West Main to Smith St., \$740; Cove Rd. storm water, from Dale to Weed Ave., \$7,560.75; Hawthorn St. storm water, \$1,542; Squeegie machine, \$900; curbing, Leeds St., \$700; curbing, Limerick St., \$625; curbing, Wardwell St., \$575; maintenance and gasoline automobile, \$750; maintenance Ferguson Library, \$10,000; Pacific and Crosby St., storm water, \$325; Jefferson St. storm water, \$880; West Main St. retaining walls, \$850; City Survey, \$2,500; total, \$61,127.18.

**Wilmington, Del.**—Bids will be opened by City Council Jan. 26 for \$75,000 4½% street and sewer bonds. Council has indorsed \$400,000 loan for street paving, the water department wants \$350,000 for additional reservoirs, and park department wants \$350,000 for purchase and improvement of additional park lands.

**West Palm Beach, Fla.**—At meeting of city council bonds which were voted to provide for street, sewer and seawall improvements were sold to New York firm for \$97,000.

**Indianapolis, Ind.**—Bids will be received at office of the treasurer of Marion county, Indianapolis, Ind., up to 12 m., January 18, 1915, for purchase of \$9,000 improvement bonds of said county. C. Van Hake is treasurer.

**Kendallville, Ind.**—Bond issue of \$15,000 has been sold.

**Council Bluffs, Ia.**—Erection of new city hall is being discussed.

**Louisville, Ky.**—Plans agreed upon by Chief of Police Lindsey and Board of Public Safety for Police Department include erection of new \$25,000 police station for Fourth police district and adoption of Canadian patrol system for mounted police of Fourth, Seventh and Sixth districts.

**Lynn, Mass.**—Appropriation of \$12,000 is asked for to enlarge the Lynn bathhouse on Nahant Beach.

**Saugus, Mass.**—In his annual report to Board of Selectmen, Chief of Police Charles O. Thompson asks for appropriation of \$10,000 for year 1915, and recommends purchase of motor police ambulance for police department.

**Detroit, Mich.**—Garbage reduction plant to cost \$500,000 will shortly be constructed.

**Atkin, Minn.**—County commissioners have decided to build new county jail.

**Atlantic City, N. J.**—Bids were received for laying of conduits in which to bury all wires of police and fire alarm systems. Contract will probably be awarded in a few days. The bidders and their respective amounts are as follows: Edwin H. Ware, \$3,287.50; Kelley-McFeeley Co., \$4,171; Frank Miller, \$4,764.61; Atlantic Construction & Supply Co., \$4,494.25, and Edward L. Bader, \$4,580.

**Bayonne, N. J.**—Purchase of automobile patrol wagon is recommended by Chief of Police.

**Garfield, N. J.**—Purchase of automobile patrol is recommended by Police Chief J. A. Fors.

**Long Branch, N. J.**—Bids will be received by the City Comptroller of City of Long Branch until four o'clock p. m. on Thursday, January 21, 1915, for purchase of \$30,000 beach improvement bonds of the City of Long Branch. Frank L. Howland is City Comptroller.

**Newark, N. J.**—Building Committee is considering repairing of city hall.

**Newark, N. J.**—Mayor Raymond has sent to Board of Works this afternoon message designating advisory committee of five to consider with former body best method of garbage disposal for Newark.

**Brooklyn, N. Y.**—Park Commissioner Weier has applied to Board of Estimate for appropriation of \$60,000 for construction of service group of buildings in Forest Park.

**Dunkirk, N. Y.**—Purchase of new motor cycle is recommended.

**Middletown, N. Y.**—Bids will be received by Commission of Public Safety until 4 p. m., February 20, 1915, for following: Chopping, cleaning and draining; 2,510 lin. ft. of trenching and refilling; 1,600 lin. ft. deep trenching and refilling; 1,890 lin. ft. grading and embanking over pipe; 6,000 lin. ft. laying, jointing and caulking 20-in. pipe; all testing pipes under pressure. J. C. Degelman is Com'r of Public Safety.

**Port Dickinson, N. Y.**—At meeting of Board of Trustees of village of Port Dickinson \$39,000 worth of village bonds at rate of \$102.01 for each \$100 was sold to George B. Gibbons Company of New York City.

**Syracuse, N. Y.**—Following are items being discussed by Park Commission for year 1915: Completion of the new southeast playgrounds before June 1. Completion of the Burnet Park playgrounds in the early summer. Erection of permanent park buildings in Onondaga, Burnet, Park, Kirk, Lincoln and Schiller parks. Commencement of a complete electric lighting system for all larger parks. Construction of a dam, enlarging the lake in Kirk Park, and a bridge over Onondaga Creek inside the park. Planting three acres of roses in the spring, establishing the Onondaga Park Rose Garden to be one of the finest in the United States. Improvement of roads and walks in the important parks and the planting of several thousand shrubs and trees.

**Marietta, O.**—Mayor Okey has recommended purchase of machinery needed for municipal work.

**Massillon, O.**—Ordinance has been adopted providing for issuance of bonds in sum of \$6,000 for purchasing site for city barn and yards and erecting or remodeling buildings thereon and for purchase necessary equipment for Public Service Department.

**Youngstown, O.**—Sum of \$2,000 has been appropriated for motor truck for city engineering department.

**Beaver, Pa.**—Resolutions have been passed authorizing city clerk to advertise for automobile patrol wagon, an automobile flush wagon with sprinkler attachments, and garbage collector's wagon.

**Philadelphia, Pa.**—Subscription blanks are available at Mayor's office for sale "over the counter" of \$5,000,000 of authorized 30-year 4 per cent municipal bonds, which begins in city treasurer's office at opening of business on Thursday, January 21.

**York, Pa.**—Appropriations totaling \$217,525.83 for various departments of city government during present fiscal year are contained in ordinance passed by council.

**Wilkes-Barre, Pa.**—City improvement bonds in sum of \$10,000 will be sold at public auction at 2 p. m., Jan. 21. F. H. Gates is City Clerk.

**Williamsport, Pa.**—City Council has approved of ordinance for purchase of automobile truck for \$5,000.

**Knoxville, Tenn.**—Mayor Heiskell has recommended levy of a special tax for new city hall.

**Houston, Tex.**—At meeting of city council ordinance was passed on its first reading providing for issuance and sale of \$1,950,000 worth of recently authorized municipal bonds. Council has voted to issue following amounts for purposes named: \$500,000 for sanitary sewers; \$500,000 for drainage; \$500,000 for wharf and warehouse improvements on the ship channel; \$200,000 for schools, and \$250,000 for park improvements.

**Newport News, Va.**—Members of City Council ordinance and police committee has recommended that city purchase a Buick chassis and have body built for police patrol, at cost of approximately \$1,700.

**Richmond, Va.**—The Administrative Board has unanimously adopted resolution calling upon City Council for appropriation of \$350,000 for erection of modern up-to-date pavilion hospital, to be built on site to be selected later.

**Seattle, Wash.**—City council has authorized city comptroller to call for bids on a \$500,000 loan to be made by city January 23, at 6 per cent.

**Tacoma, Wash.**—Specifications for new police patrol have been completed by Public Safety Commissioner Mills and they will be presented to council within few days for approval. Specifications call for at least a 40-horsepower engine and a speed of not less than 45 miles an hour.

#### CONTRACTS AWARDED.

**Hibbing, Minn.**—To McGuire Incinerator Co., Chicago, Ill., at \$9,500, for installation of two units of garbage incinerator.

**Erie, Pa.**—Contracts for asphalt and fuel oil to be used at municipal asphalt plant during current year have been awarded to lowest bidders by Council. The Burnwell Coal Co. will furnish city with Alpha Portland asphalt at \$1.53 barrel, and Atlantic Refining Co. fuel oil at \$0.02 9-10.